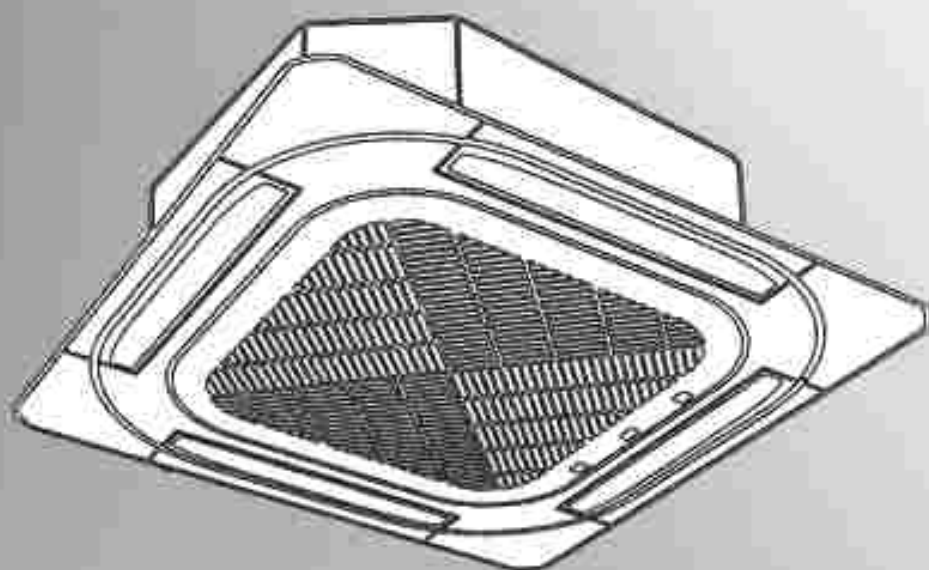




# Owner's, Installation & Safety Manual



**Ceiling Cassette Air Conditioner**

**MODEL:**

**KLM-IS40-AA1M32**

**KLM-IS60-AA1M32**

**IMPORTANT NOTE:**

Read this manual carefully before installing or operating your new air conditioning unit.  
Make sure to save this manual for future reference.

Please check the applicable models, technical data from the nameplate pasted on the unit.



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# Safety Precautions

## Read Safety Precautions Before Operation and Installation

**Incorrect installation due to ignoring instructions can cause serious damage or injury.** The seriousness of potential damage or injuries is classified as either a **WARNING** or **CAUTION**.



### WARNING

This symbol indicates the possibility of personnel injury or loss of life.



### CAUTION

This symbol indicates the possibility of property damage or serious consequences.



### WARNING

This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision (EN Standard requirements).

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.



### WARNINGS FOR PRODUCT USE

- If an abnormal situation arises (like a burning smell), immediately turn off the unit and disconnect the power. Call Koln hotline or service center for instructions to avoid electric shock, fire or injury.
- **Do not** insert fingers, rods or other objects into the air inlet or outlet. This may cause injury, since the fan may be rotating at high speeds.
- **Do not** use flammable sprays such as hair spray, lacquer or paint near the unit. This may cause fire or combustion.
- **Do not** operate the air conditioner in places near or around combustible gases. Emitted gas may collect around the unit and cause explosion.
- **Do not** operate your air conditioner in a wet room such as a bathroom or laundry room. Too much exposure to water can cause electrical components to short circuit.
- **Do not** expose your body directly to cool air for a prolonged period of time.
- **Do not** allow children to play with the air conditioner. Children must be supervised around the unit at all times.
- If the air conditioner is used together with burners or other heating devices, thoroughly ventilate the room to avoid oxygen deficiency.
- In certain functional environments, such as kitchens, server rooms, etc., the use of specially designed air-conditioning units is highly recommended.

### CLEANING AND MAINTENANCE WARNINGS

- Turn off the device and disconnect the power before cleaning. Failure to do so can cause electrical shock.
- **Do not** clean the air conditioner with excessive amounts of water.
- **Do not** clean the air conditioner with combustible cleaning agents. Combustible cleaning agents can cause fire or deformation.

## CAUTION

- Turn off the air conditioner and disconnect the power if you are not going to use it for a long time.
- Turn off and unplug the unit during storms.
- Make sure that water condensation can drain unhindered from the unit.
- **Do not** operate the air conditioner with wet hands. This may cause electric shock.
- **Do not** use device for any other purpose than its intended use.
- **Do not** climb onto or place objects on top of the outdoor unit.
- **Do not** allow the air conditioner to operate for long periods of time with doors or windows open, or if the humidity is very high.

## ELECTRICAL WARNINGS

- Only use the specified power cord. If the power cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.
- Keep power plug clean. Remove any dust or grime that accumulates on or around the plug. Dirty plugs can cause fire or electric shock.
- **Do not** pull power cord to unplug unit. Hold the plug firmly and pull it from the outlet. Pulling directly on the cord can damage it, which can lead to fire or electric shock.
- **Do not** modify the length of the power supply cord or use an extension cord to power the unit.
- **Do not** share the electrical outlet with other appliances. Improper or insufficient power supply can cause fire or electrical shock.
- The product must be properly grounded at the time of installation, or electrical shock may occur.
- For all electrical work, follow all local and national wiring standards, regulations, and the Installation Manual. Connect cables tightly, and clamp them securely to prevent external forces from damaging the terminal. Improper electrical connections can overheat and cause fire, and may also cause shock. All electrical connections must be made according to the Electrical Connection Diagram located on the panels of the indoor and outdoor units.
- All wiring must be properly arranged to ensure that the control board cover can close properly. If the control board cover is not closed properly, it can lead to corrosion and cause the connection points on the terminal to heat up, catch fire, or cause electrical shock.
- If connecting power to fixed wiring, an all-pole disconnection device which has at least 3mm clearances in all poles, and have a leakage current that may exceed 10mA, the residual current device(RCD) having a rated residual operating current not exceeding 30mA, and disconnection must be incorporated in the fixed wiring in accordance with the wiring rules.

## TAKE NOTE OF FUSE SPECIFICATIONS

The air conditioner's circuit board (PCB) is designed with a fuse to provide overcurrent protection.

The specifications of the fuse are printed on the circuit board, such as :

T3.15A/250VAC, T5A/250VAC, etc.

T20A/250VAC( $\leq$ 24000Btu/h units), T30A/250VAC( $>$ 24000Btu/h units)

**NOTE:** For the units with R32 or R290 refrigerant, only the blast-proof ceramic fuse can be used.

## UV-C lamp(Applicable to the unit contains an UV-C lamp only)

This appliance contains a UV-C lamp. Read the maintenance instructions before opening the appliance.

1. Do not operate UV-C lamps outside of the appliance.
2. Appliances that are obviously damaged must not be operated.
3. Unintended use of the appliance or damage to the housing may result in the escape of dangerous UV-C radiation. UV-C radiation may, even in small doses, cause harm to the eyes and skin.

4. Before opening doors and access panels bearing the ULTRAVIOLET RADIATION hazard symbol for the conducting USER MAINTENANCE, it is recommended to disconnect the power.
5. The UV-C lamp can not be cleaned, repaired and replaced.
6. UV-C BARRIERS bearing the ULTRAVIOLET RADIATION hazard symbol should not be removed.

**⚠ WARNING** This appliance contains an UV emitter. Do not stare at the light source.

## **⚠ WARNINGS FOR PRODUCT INSTALLATION**

1. Installation must be performed by Kolin authorized technicians or service center. Defective installation can cause water leakage, electrical shock, or fire.
2. Installation must be performed according to the installation instructions. Improper installation can cause water leakage, electrical shock, or fire.  
(In North America, installation must be performed in accordance with the requirement of NEC and CEC by authorized personnel only.)
3. Contact Kolin authorized technicians or service center for repair or maintenance of this unit. This appliance shall be installed in accordance with wiring regulations.
4. Only use the included accessories, parts, and specified parts for installation. Using non-standard parts can cause water leakage, electrical shock, fire, and can cause the unit to fail.
5. Install the unit in a firm location that can support the unit's weight. If the chosen location cannot support the unit's weight, or the installation is not done properly, the unit may drop and cause serious injury and damage.
6. Install drainage piping according to the instructions in this manual. Improper drainage may cause water damage to your home and property.
7. For units that have an auxiliary electric heater, **do not** install the unit within 1 meter (3 feet) of any combustible materials.
8. **Do not** install the unit in a location that may be exposed to combustible gas leaks. If combustible gas accumulates around the unit, it may cause fire.
9. Do not turn on the power until all work has been completed.
10. When moving or relocating the air conditioner, consult experienced service technicians for disconnection and reinstallation of the unit.
11. How to install the appliance to its support, please read the information for details in "indoor unit installation" and "outdoor unit installation" sections.

### **Note about Fluorinated Gasses (Not applicable to the unit using R290 Refrigerant)**

1. This air-conditioning unit contains fluorinated greenhouse gasses. For specific information on the type of gas and the amount, please refer to the relevant label on the unit itself or the "Owner's Manual - Product Fiche" in the packaging of the outdoor unit. (European Union products only).
2. Installation, service, maintenance and repair of this unit must be performed by a certified technician.
3. Product uninstallation and recycling must be performed by a certified technician.
4. For equipment that contains fluorinated greenhouse gases in quantities of 5 tonnes of CO<sub>2</sub> equivalent or more, but of less than 50 tonnes of CO<sub>2</sub> equivalent, if the system has a leak-detection system installed, it must be checked for leaks at least every 24 months.
5. When the unit is checked for leaks, proper record-keeping of all checks is strongly recommended.

**WARNING for Using R32/R290 Refrigerant**

- When flammable refrigerant are employed, appliance shall be stored in a well-ventilated area where the room size corresponds to the room area as specified for operation.

For R32 frigerant models:

Appliance shall be installed, operated and stored in a room with a floor area larger than  $X \text{ m}^2$ .

Appliance shall not be installed in an unventilated space, if that space is smaller than  $X \text{ m}^2$

(Please see the following form).

Model (Btu/h)	Amount of refrigerant to be charged (kg)	Installation height	Minimum room area (m <sup>2</sup> )
≤12000	≤1.11	2.2m	1
18000	≤1.63	2.2m	2
24000	≤2.58	2.2m	3
30000	≤3.08	2.2m	7
36000	≤3.84	2.2m	10
42000-48000	≤4.24	2.2m	12
55000-60000	≤4.30	2.2m	13

- Reusable mechanical connectors and flared joints are not allowed indoors. (EN Standard Requirements).
- Mechanical connectors used indoors shall have a rate of not more than 3g/year at 25% of the maximum allowable pressure. When mechanical connectors are reused indoors, sealing parts shall be renewed. When flared joints are reused indoors, the flare part shall be re-fabricated. (UL Standard Requirements)
- When mechanical connectors are reused indoors, sealing parts shall be renewed. When flared joints are reused indoors, the flare part shall be re-fabricated. (IEC Standard Requirements)
- Mechanical connectors used indoors shall comply with ISO 14903.

**European Disposal Guidelines**

This marking shown on the product or its literature, indicates that waste electrical and electrical equipment should not be mixed with general household waste.

**Correct Disposal of This Product  
(Waste Electrical & Electronic Equipment)**

This appliance contains refrigerant and other potentially hazardous materials. When disposing of this appliance, the law requires special collection and treatment. **Do not** dispose of this product as household waste or unsorted municipal waste.

When disposing of this appliance, you have the following options:

- Dispose of the appliance at designated municipal electronic waste collection facility.
- When buying a new appliance, the retailer will take back the old appliance free of charge.
- The manufacturer will take back the old appliance free of charge.
- Sell the appliance to certified scrap metal dealers.

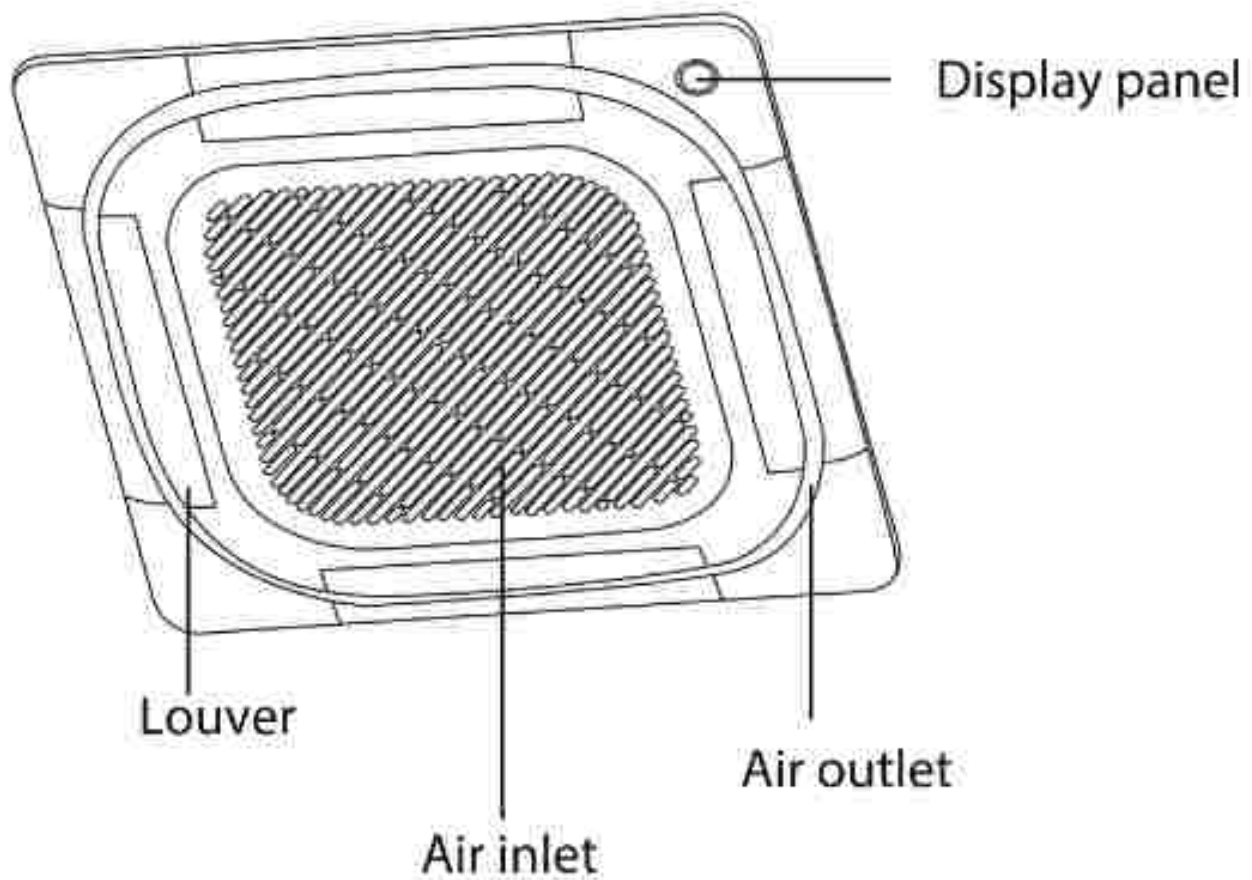
**Special notice**

Disposing of this appliance in the forest or other natural surroundings endangers your health and is bad for the environment. Hazardous substances may leak into the ground water and enter the food chain.

# Unit Specifications and Features

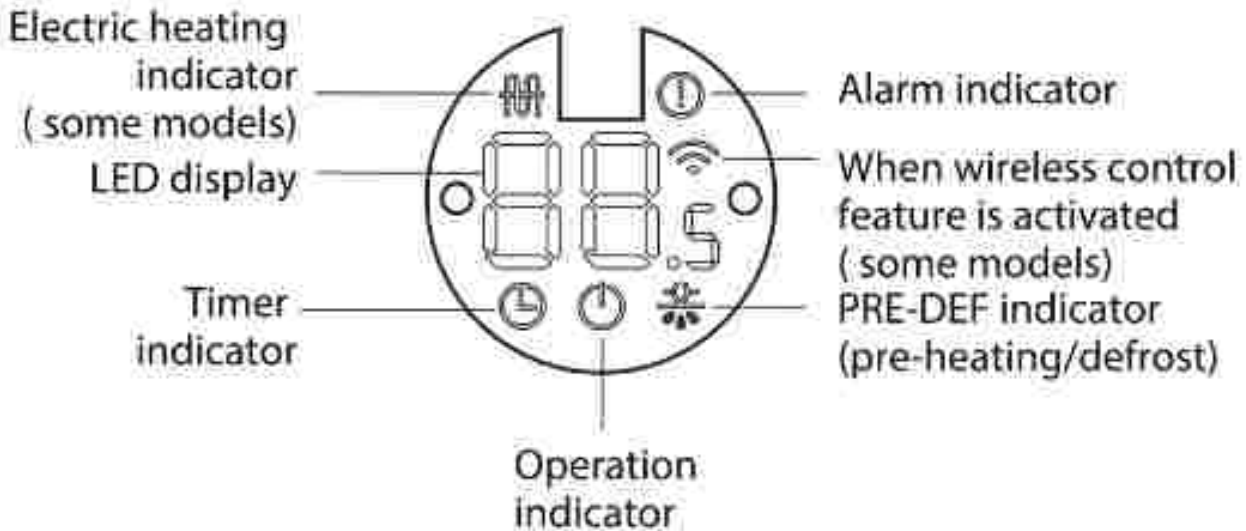
## Indoor unit display

This display panel on the indoor unit can be used to operate the unit in case the remote control has been misplaced or is out of batteries.



# Unit Specifications and Features

## Indoor unit display



- **MANUAL button** : This button selects the mode in the following order: AUTO, FORCED COOL, OFF.
- **FORCED COOL mode** : In FORCED COOL mode, the Operation light flashes. The system will then turn to AUTO after it has cooled with a high wind speed for 30 minutes. The remote control will be disabled during this operation.
- **OFF mode** : When the display panel is turned off, the unit turns off and the remote control is re-enabled.

## Operating temperature

When your air conditioner is used outside of the following temperature ranges, certain safety protection features may activate and cause the unit to disable.

### Inverter Split Type

	COOL mode	HEAT mode	DRY mode
Room Temperature	17°C - 30°C (60°F - 86°F)	0°C - 30°C (32°F - 86°F)	17°C - 30°C (50°F - 86°F)
Outdoor Temperature	0°C - 43°C (32°F - 109°F)		
	-15°C - 50°C (5°F - 122°F) (For models with low temp. cooling systems.)	-15°C - 24°C (5°F - 75°F)	0°C - 43°C (32°F - 109°F)

#### FOR OUTDOOR UNITS WITH AUXILIARY ELECTRIC HEATER

When outside temperature is below 0°C (32°F), we strongly recommend keeping the unit plugged in at all time to ensure smooth ongoing performance.

**NOTE:** Room relative humidity less than 80%. If the air conditioner operates in excess of this figure, the surface of the air conditioner may attract condensation. Please sets the vertical air flow louver to its maximum angle (vertically to the floor), and set HIGH fan mode.

#### To further optimize the performance of your unit, do the following:

- Keep doors and windows closed.
- Limit energy usage by using TIMER ON and TIMER OFF functions.
- Do not block air inlets or outlets.
- Regularly inspect and clean air filters.

## Other features

### Default Setting

When the air conditioner restarts after a power failure, it will default to the factory settings (AUTO mode, AUTO fan, 24°C (76°F)). This may cause inconsistencies on the remote control and unit panel. Use your remote control to update the status.

### Auto-Restart (some models)

In case of power failure, the system will immediately stop. When power returns, the Operation light on the indoor unit will flash. To restart the unit, press the **ON/OFF** button on the remote control. If the system has an auto restart function, the unit will restart using the same settings.

### Three-minute protection feature (some models)

A protection feature prevents the air conditioner from being activated for approximately 3 minutes when it restarts immediately after operation.

### Louver Angle Memory Function (some models)

Some models are designed with a louver angle memory function. When the unit restarts after a power failure, the angle of the horizontal louvers will automatically return to the previous position.

The angle of the horizontal louver should not be set too small as condensation may form and drip into the machine. To reset the louver, press the manual button, which will reset the horizontal louver settings.

### Refrigerant Leak Detection System (some models)

In the event of a refrigerant leak, the LED DISPLAY will display refrigerant leak error code and the LED indicator light will flash.

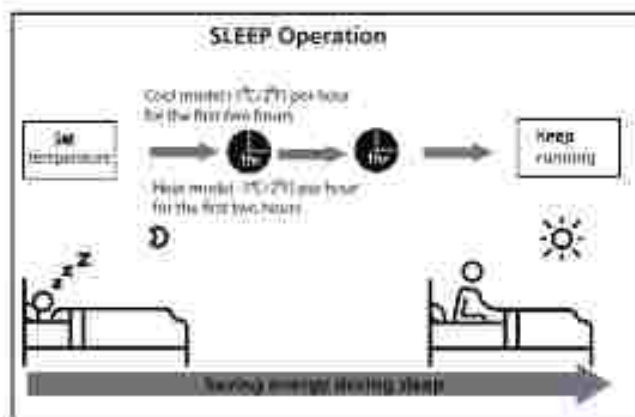
### Sleep Operation (some models)

The SLEEP function is used to decrease energy use while you sleep (and don't need the same temperature settings to stay comfortable). This function can only be activated via remote control. And the Sleep function is not available in FAN or DRY mode.

Press the **SLEEP** button when you are ready to go to sleep. When in COOL mode, the unit will increase the temperature by 1°C (2°F) after 1 hour, and will increase an additional 1°C (2°F) after another hour.

When in HEAT mode, the unit will decrease the temperature by 1°C (2°F) after 1 hour, and will decrease an additional 1°C (2°F) after another hour.

The sleep feature will stop after 8 hours and the system will keep running with final situation.



## Care and Maintenance

### Cleaning Your Indoor Unit

#### BEFORE CLEANING OR MAINTENANCE

**ALWAYS TURN OFF YOUR AIR CONDITIONER SYSTEM AND DISCONNECT ITS POWER SUPPLY BEFORE CLEANING OR MAINTENANCE.**

#### CAUTION

Only use a soft, dry cloth to wipe the unit clean. If the unit is especially dirty, you can use a cloth soaked in warm water to wipe it clean.

- **Do not** use chemicals or chemically treated cloths to clean the unit.
- **Do not** use benzene, paint thinner, polishing powder or other solvents to clean the unit. They can cause the plastic surface to crack or deform.
- **Do not** use water hotter than 40°C (104°F) to clean the front panel. This can cause the panel to deform or become discolored.

### Cleaning Your Air Filter

A clogged air conditioner can reduce the cooling efficiency of your unit, and can also be bad for your health. Make sure to clean the filter once every two weeks.

#### WARNING: DO NOT REMOVE OR CLEAN THE FILTER BY YOURSELF

Removing and cleaning the filter can be dangerous. Removal and maintenance must be performed by a certified technician.

1. Remove the air filter.
2. Clean the air filter by vacuuming the surface or washing it in warm water with mild detergent.
3. Rinse the filter with clean water and allow it to air-dry. **DO NOT** let the filter dry in direct sunlight.
4. Reinstall the filter.

If using water, the inlet side should face down and away from the water stream.



If using a vacuum cleaner, the inlet side should face the vacuum.

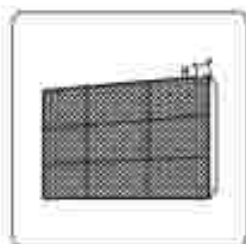


#### CAUTION

- Before changing the filter or cleaning, turn off the unit and disconnect its power supply.
- When removing filter, do not touch metal parts in the unit. The sharp metal edges can cut you.
- Do not use water to clean the inside of the indoor unit. This can destroy insulation and cause electrical shock.
- Do not expose filter to direct sunlight when drying. This can shrink the filter.
- Any maintenance and cleaning of outdoor unit should be performed by an authorized dealer or a licensed service provider.
- Any unit repairs should be performed by an authorized dealer or a licensed service provider.

## Maintenance – Long Periods of Non-Use

If you plan not to use your air conditioner for an extended period of time, do the following:



Clean all filters



Turn on FAN function until  
unit dries out completely



Turn off the unit and  
disconnect the power



Remove batteries  
from remote control

## Maintenance – Pre-Season Inspection

After long periods of non-use, or before periods  
of frequent use, do the following:



Check for damaged wires



Clean all filters



Check for leaks



Replace batteries



Make sure nothing is blocking all air inlets and outlets

# Troubleshooting

## SAFETY PRECAUTIONS

If any of the following conditions occurs, turn off your unit immediately!

- The power cord is damaged or abnormally warm.
- You smell a burning odor.
- The unit emits loud or abnormal sounds.
- A power fuse blows or the circuit breaker frequently trips.
- Water or other objects fall into or out of the unit.

**DO NOT ATTEMPT TO FIX THESE YOURSELF! CONTACT AN AUTHORIZED SERVICE PROVIDER IMMEDIATELY!**

## Common Issues

The following problems are not a malfunction and in most situations will not require repairs.

Issue	Possible Causes
Unit does not turn on when pressing ON/OFF button	The Unit has a 3-minute protection feature that prevents the unit from overloading. The unit cannot be restarted within three minutes of being turned off.
	Cooling and Heating Models: If the Operation light and PRE-DEF (Pre-heating/Defrost) indicators are lit up, the outdoor temperature is too cold and the unit's anti-cold wind is activated in order to defrost the unit.
	In Cooling-only Models: If the "Fan Only" indicator is lit up, the outdoor temperature is too cold and the unit's anti-freeze protection is activated in order to defrost the unit.
The unit changes from COOL/HEAT mode to FAN mode	The unit may change its setting to prevent frost from forming on the unit. Once the temperature increases, the unit will start operating in the previously selected mode again.
	The set temperature has been reached, at which point the unit turns off the compressor. The unit will continue operating when the temperature fluctuates again.
The indoor unit emits white mist	In humid regions, a large temperature difference between the room's air and the conditioned air can cause white mist.
Both the indoor and outdoor units emit white mist	When the unit restarts in HEAT mode after defrosting, white mist may be emitted due to moisture generated from the defrosting process.
The indoor unit makes noises	A rushing air sound may occur when the louver resets its position.
	A squeaking sound is heard when the system is OFF or in COOL mode. The noise is also heard when the drain pump (optional) is in operation.
	A squeaking sound may occur after running the unit in HEAT mode due to expansion and contraction of the unit's plastic parts.
Both the indoor unit and outdoor unit make noises	Low hissing sound during operation: This is normal and is caused by refrigerant gas flowing through both indoor and outdoor units.
	Low hissing sound when the system starts, has just stopped running, or is defrosting. This noise is normal and is caused by the refrigerant gas stopping or changing direction.
	Squeaking sound: Normal expansion and contraction of plastic and metal parts caused by temperature changes during operation can cause squeaking noises.

Issue	Possible Causes
The outdoor unit makes noises	The unit will make different sounds based on its current operating mode.
Dust is emitted from either the indoor or outdoor unit	The unit may accumulate dust during extended periods of non-use, which will be emitted when the unit is turned on. This can be mitigated by covering the unit during long periods of inactivity.
The unit emits a bad odor	The unit may absorb odors from the environment (such as furniture, cooking, cigarettes, etc.) which will be emitted during operations.
	The unit's filters have become moldy and should be cleaned.
The fan of the outdoor unit does not operate	During operation, the fan speed is controlled to optimize product operation.

**NOTE:** If problem persists, contact a local dealer or your nearest customer service center. Provide them with a detailed description of the unit malfunction as well as your model number.

## Troubleshooting

When troubles occur, please check the following points before contacting a repair company.

Problem	Possible Causes	Solution
<b>Poor Cooling Performance</b>	Temperature setting may be higher than ambient room temperature	Lower the temperature setting.
	The heat exchanger on the indoor or outdoor unit is dirty	Clean the affected heat exchanger.
	The air filter is dirty	Remove the filter and clean it according to instructions.
	The air inlet or outlet of either unit is blocked	Turn the unit off, remove the obstruction and turn it back on.
	Doors and windows are open	Make sure that all doors and windows are closed while operating the unit.
	Excessive heat is generated by sunlight	Close windows and curtains during periods of high heat or bright sunshine.
	Too many sources of heat in the room (people, computers, electronics, etc.)	Reduce amount of heat sources.
	Low refrigerant due to leak or long-term use	Check for leaks, re-seal if necessary and top off refrigerant.




















Problem	Possible Causes	Solution
<b>The unit is not working</b>	Power failure	Wait for the power to be restored.
	The power is turned off	Turn on the power.
	The fuse is burned out	Replace the fuse.
	Remote control batteries are dead	Replace batteries.
	The Unit's 3-minute protection has been activated	Wait three minutes after restarting the unit.
	Timer is activated	Turn timer off.
<b>The unit starts and stops frequently</b>	There's too much or too little refrigerant in the system	Check for leaks and recharge the system with refrigerant.
	Incompressible gas or moisture has entered the system.	Evacuate and recharge the system with refrigerant.
	System circuit is blocked	Determine which circuit is blocked and replace the malfunctioning piece of equipment.
	The compressor is broken	Replace the compressor.
	The voltage is too high or too low	Install a manostat to regulate the voltage.
<b>Poor heating performance</b>	The outdoor temperature is extremely low	Use auxiliary heating device.
	Cold air is entering through doors and windows	Make sure that all doors and windows are closed during use.
	Low refrigerant due to leak or long-term use	Check for leaks, re-seal if necessary and top off refrigerant.
<b>Indicator lamps continue flashing</b>		
Error code appears and begins with the letters as the following in the window display of indoor unit: • E(x), P(x), F(x) • EH(xx), EL(xx), EC(xx) • PH(xx), PL(xx), PC(xx)	The unit may stop operation or continue to run safely. If the indicator lamps continue to flash or error codes appear, wait for about 10 minutes. The problem may resolve itself. If not, disconnect the power, then connect it again. Turn the unit on. If the problem persists, disconnect the power and contact your nearest customer service center.	

**NOTE:** If your problem persists after performing the checks and diagnostics above, turn off your unit immediately and contact an authorized service center.

# Accessories

The air conditioning system comes with the following accessories. Use all of the installation parts and accessories to install the air conditioner. Improper installation may result in water leakage, electrical shock and fire, or cause the equipment to fail. The items are not included with the air conditioner must be purchased separately.

Accessories

Name of Accessories	Q'ty(pc)	Shape	Name of Accessories	Q'ty(pc)	Shape
Manual	2-4		Installation paper template (some models)	1	
Soundproof/insulation sheath (some models)	1		Anti-shock rubber (some models)	1	
Soundproof/insulation sheath (some models)	1		Drain joint (some models)	1	
Outlet pipe sheath (some models)	1		Seal ring (some models)	1	
Outlet pipe clasp (some models)	1-2 (depending on models)		Copper nut	2	
Ceiling hook (some models)	4		Magnetic ring (wrap the electric wires S1 & S2 (P & Q & E) around the magnetic ring twice) (some models)	1	
Suspension bolt (some models)	4		Magnetic ring (Hitch it on the connective cable between indoor unit and outdoor unit after installation.) (some models)	Varies by model	
Throttle (some units)	1		Tapping screw (some models)	4	
Belt (some models)	4-6 (depending on models)		Throat bander (some models)	2	
Conduit installation plate (some models)	1				

## Optional accessories

- There are two types of remote controls: wired and wireless. Select a remote controller based on customer preferences and requirements and install in an appropriate place. Refer to catalogues and technical literature for guidance on selecting a suitable remote controller.

Name	Shape	Quantity(PC)
Connecting pipe assembly	Liquid side	Φ6.35(1/4in)
		Φ9.52(3/8in)
		Φ12.7(1/2in)
	Gas side	Φ9.52(3/8in)
		Φ12.7(1/2in)
		Φ16(5/8in)
		Φ19(3/4in)
	Φ22(7/8in)	
Parts you must purchase separately. Consult the dealer about the proper pipe size of the unit you purchased.		

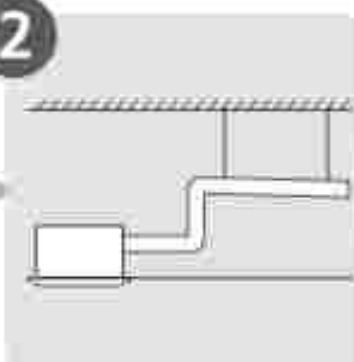
# Installation Summary

1



Install the indoor unit

2



Install the drainpipe

3



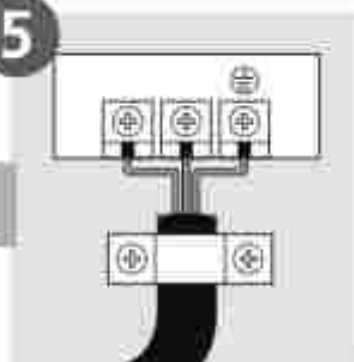
Install the outdoor unit

6



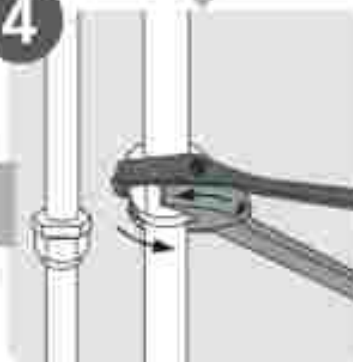
Evacuate the refrigeration system

5



Connect the wires

4



Connect the refrigerant pipes

7



Install the front panel

8



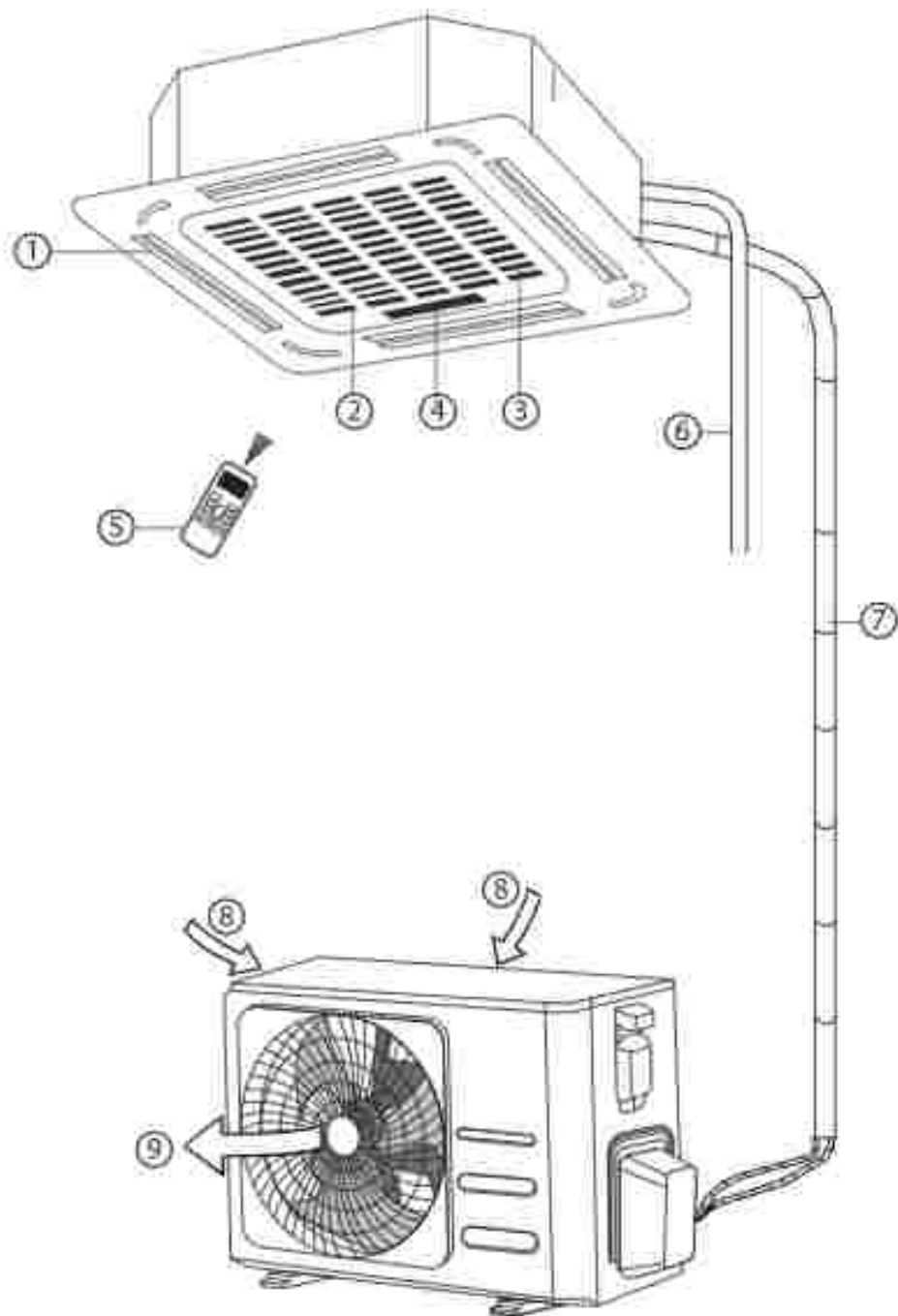
Perform a test run

## Unit Parts

**NOTE:** The installation must be performed in accordance with the requirement of local and national standards. The installation may be slightly different in different areas.

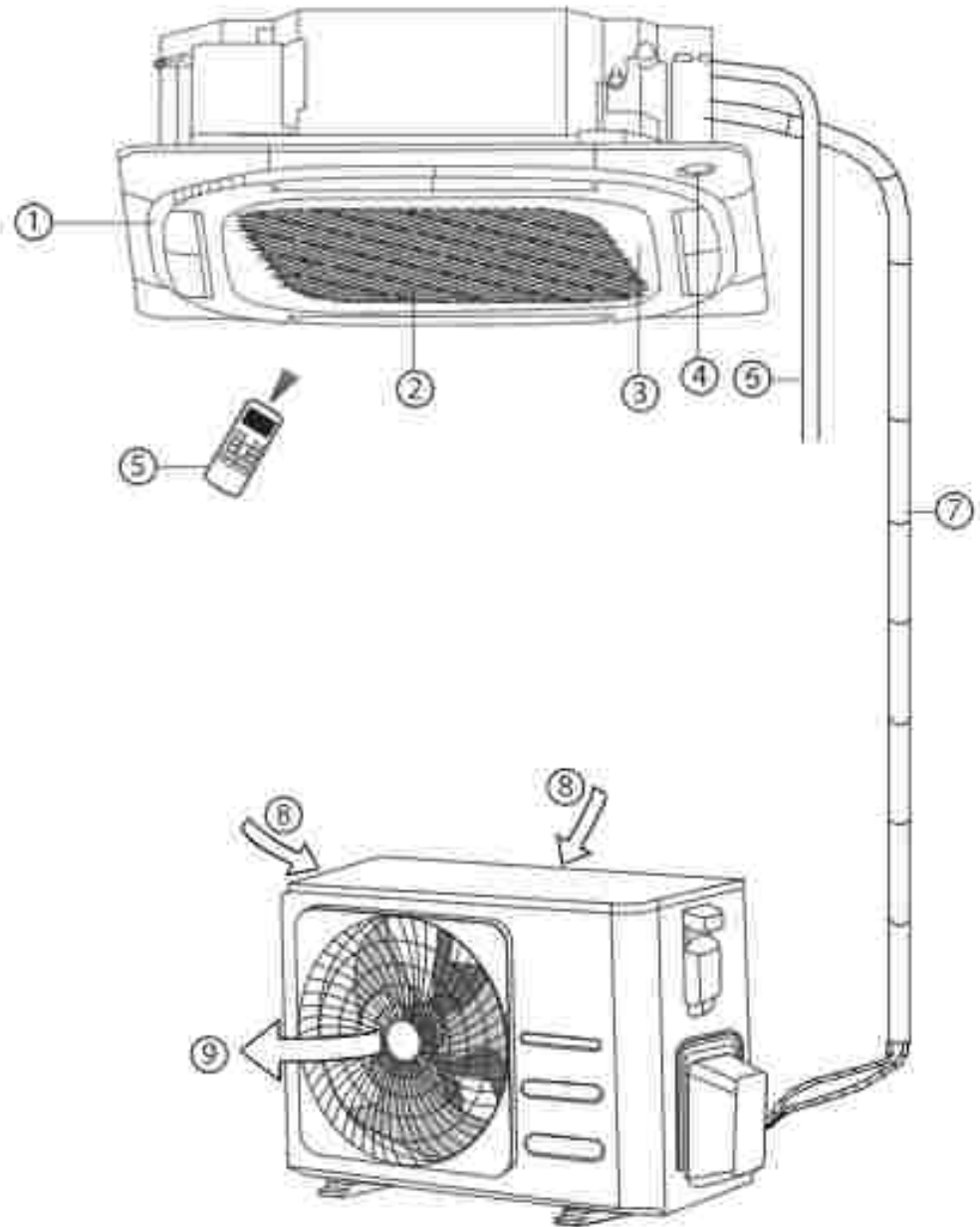
(A)

- ① Air outlet
- ② Air inlet
- ③ Front grille
- ④ Display panel
- ⑤ Remote controller
- ⑥ Drain pipe
- ⑦ Connecting pipe
- ⑧ Air inlet
- ⑨ Air outlet



(B)

- ① Air outlet
- ② Air inlet
- ③ Front grille
- ④ Display panel
- ⑤ Remote controller
- ⑥ Drain pipe
  
- ⑦ Connecting pipe
- ⑧ Air inlet
- ⑨ Air outlet



#### NOTE ON ILLUSTRATIONS

Illustrations in this manual are for explanatory purposes. The actual shape of your indoor unit may be slightly different. The actual shape shall prevail.

# Indoor Unit Installation

## Installation Instructions – Indoor unit

**NOTE:** Panel installation should be performed after piping and wiring have been completed.

### Step 1: Select installation location

Before installing the indoor unit, you must choose an appropriate location. The following are standards that will help you choose an appropriate location for the unit.

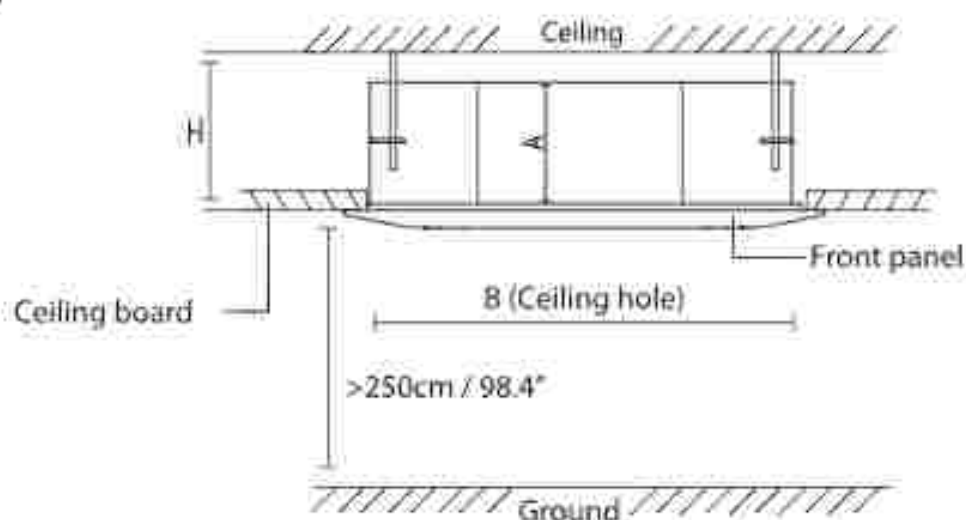
#### Proper installation locations meet the following standards:

- ☑ Enough room exists for installation and maintenance.
  - ☑ Enough room exists for the connecting the pipe and drainpipe.
  - ☑ The ceiling is horizontal and its structure can sustain the weight of the indoor unit.
  - ☑ The air inlet and outlet are not blocked.
  - ☑ The airflow can fill the entire room.
  - ☑ There is no direct radiation from heaters.
- ⊗ Areas with oil drilling or fracking.
  - ⊗ Coastal areas with high salt content in the air.
  - ⊗ Areas with caustic gases in the air, such as hot springs.
  - ⊗ Areas that experience power fluctuations, such as factories.
  - ⊗ Enclosed spaces, such as cabinets.
  - ⊗ Kitchens that use natural gas.
  - ⊗ Areas with strong electromagnetic waves.
  - ⊗ Areas that store flammable materials or gas.
  - ⊗ Rooms with high humidity, such as bathrooms or laundry rooms.

### Recommended distances between the indoor unit and the ceiling

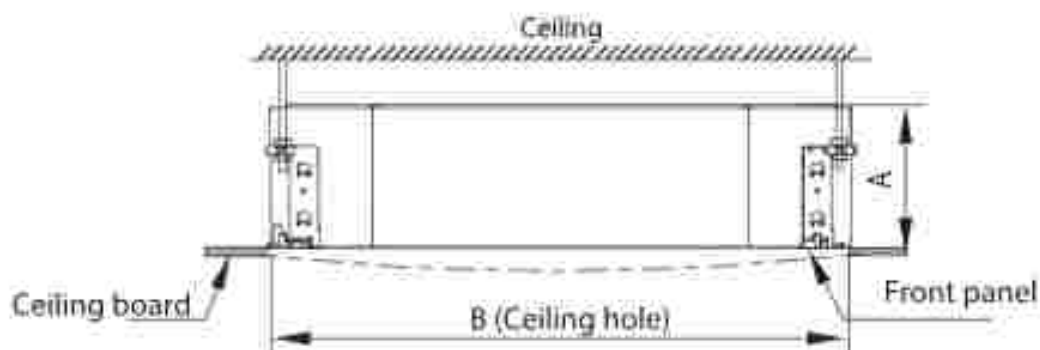
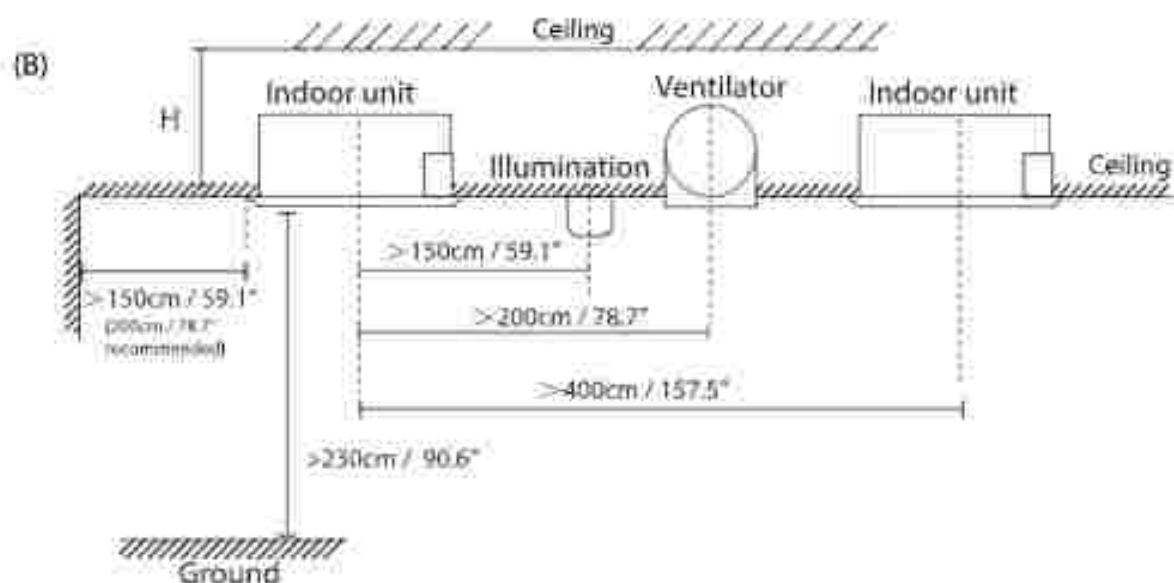
The distance between the mounted indoor unit and the internal ceiling should meet the following specifications.

(A)



### Distance from ceiling relative to height of indoor unit

TYPE	MODEL	Length of A (mm/inch)	Length of H (mm/inch)	Length of B (mm/inch)
Ceiling Cassette	18-24	205/8	> 235/9.3	880/34.5
	24	245/9.6	> 275/10.8	
	30	205/8	> 235/9.3	
	30-48	245/9.6	> 275/10.8	
	48-60	287/11.3	> 317/12.5	
	48-60	287/11.3	> 317/12.5	940/37.0
Compact models		260/10.2	> 290/11.4	600/23.6



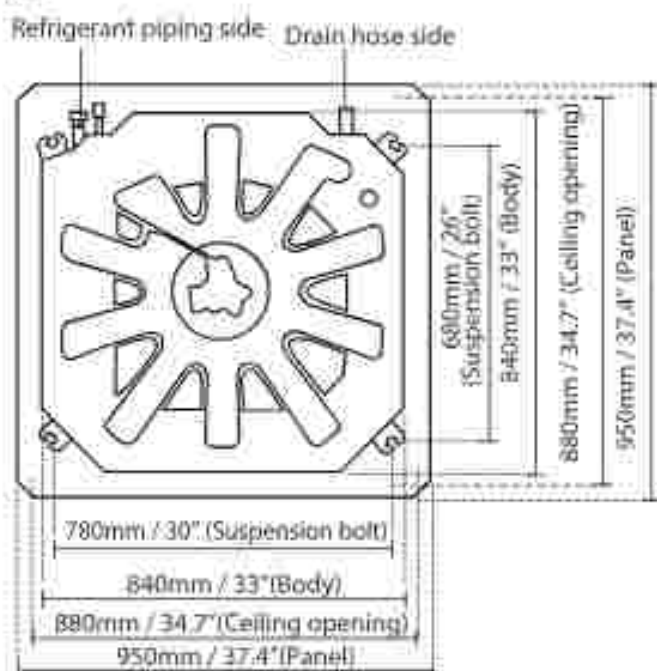
### Distance from ceiling relative to height of indoor unit

MODEL	Length of A (mm/inch)	Length of H (mm/inch)	Length of B (mm/inch)
18-24	205/8.03	230/9.06	900/35.4
30-42	245/9.65	271/10.7	
42-60	287/11.3	313/12.3	

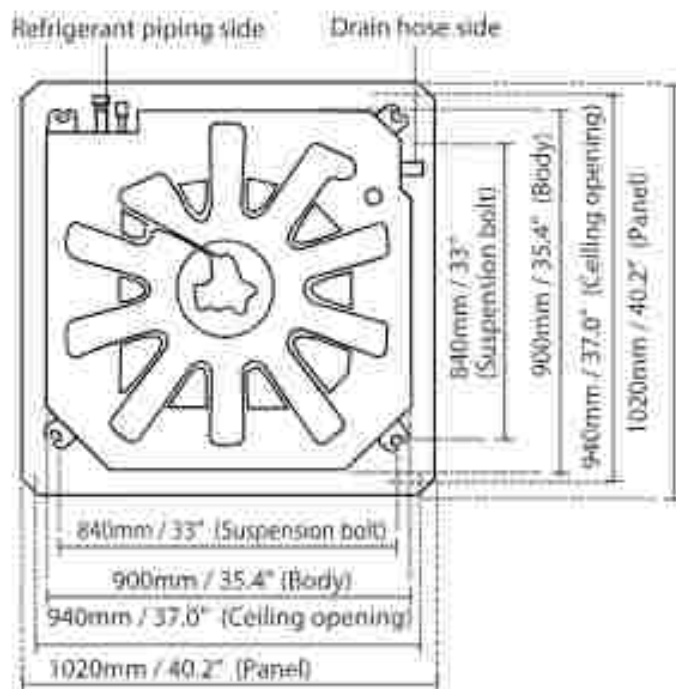
## Step 2: Hang indoor unit

1. Use the included paper template to cut a rectangular hole in the ceiling, leaving at least 1m (39") on all sides. The cut hole size should be 4cm (1.6") larger than the body size. Be sure to mark the areas where ceiling hook holes will be drilled.

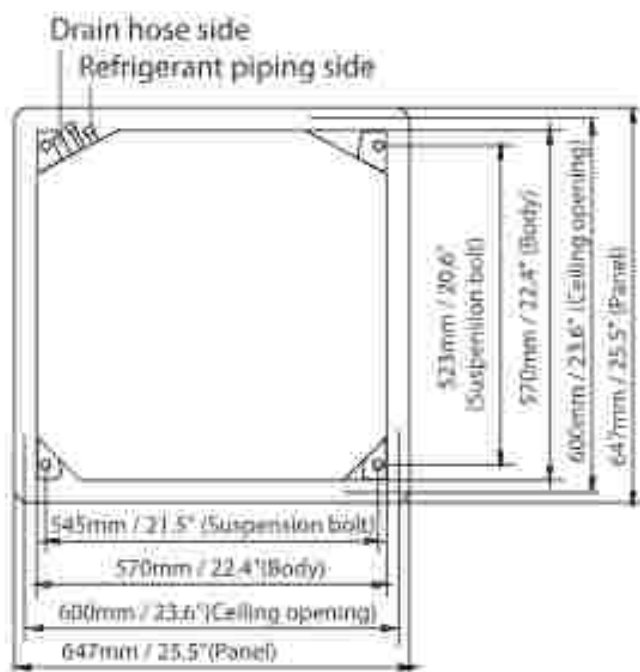
(A)



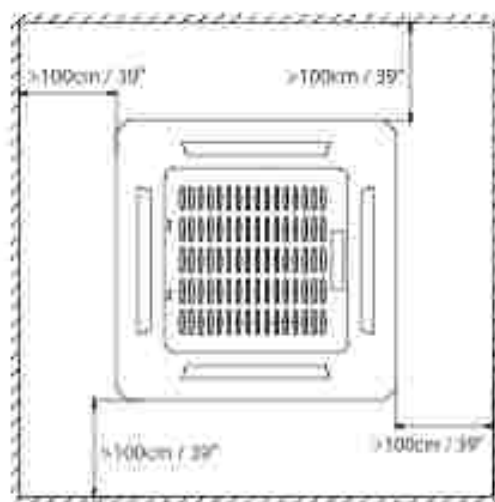
18-48K Super-Slim models ceiling hole size



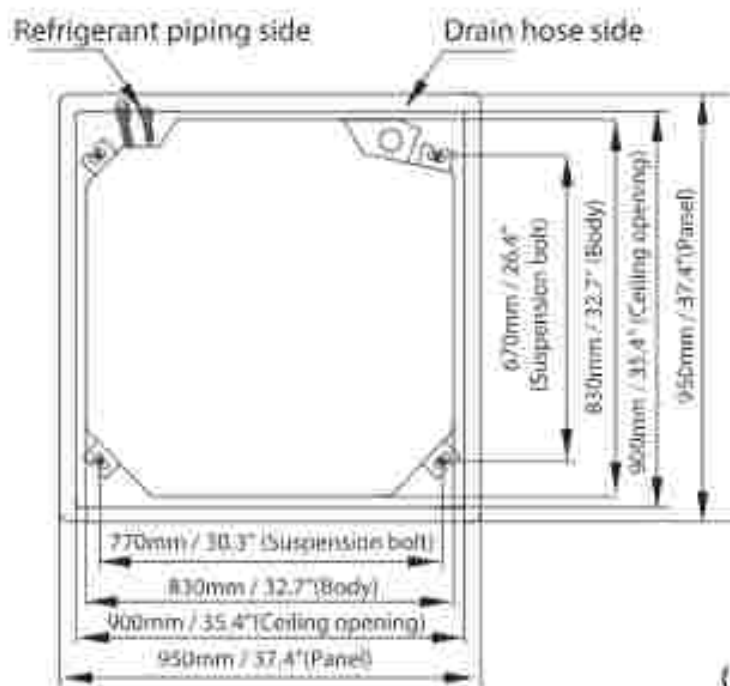
60K Super-Slim models ceiling hole size



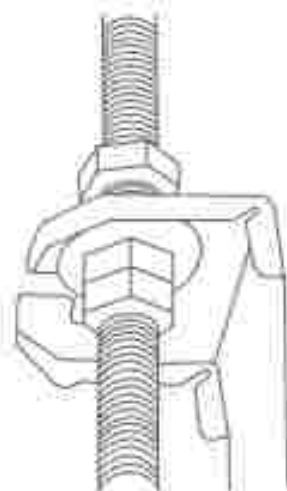
Compact models ceiling hole size



(B)

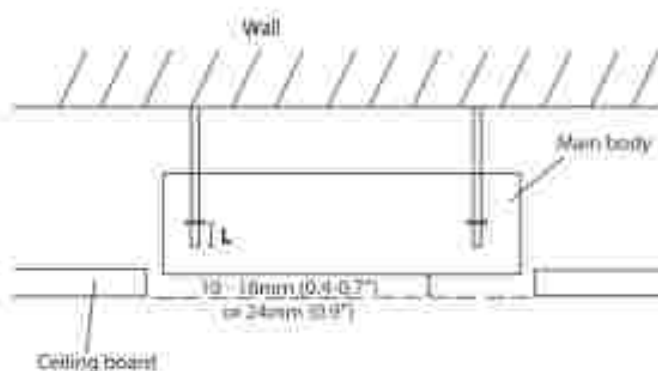


5. Mount the indoor unit. You will need two people to lift and secure it. Insert suspension bolts into the unit's hanging holes. Fasten them using the included washers and nuts.



(A)

**NOTE:** The bottom of the unit should be 10-18mm (0.4-0.7") (Super-Slim models) or 24mm (0.9") (Compact models) higher than the ceiling board. Generally, L (indicated in the following figure) should be half the length of the suspension bolt or long enough to prevent the nuts from coming off.



Indoor Unit  
Installation

### CAUTION

The unit body should align perfectly with the hole. Ensure that the unit and the hole are the same size before moving on.

2. (A)

Drill 4 holes 5cm (2") deep at the ceiling hook positions in the internal ceiling. Be sure to hold the drill at a 90° angle to the ceiling.

(B)

Drill 4 holes 12cm-15.5cm (4.7"-6.1") deep at the ceiling hook positions in the internal ceiling. Be sure to hold the drill at a 90° angle to the ceiling.

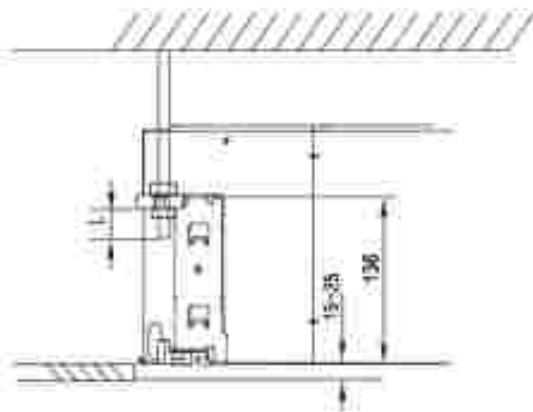
3. Using a hammer, insert the ceiling hooks into the pre-drilled holes. Secure the bolt using the included washers and nuts.

4. Install the four suspension bolts.



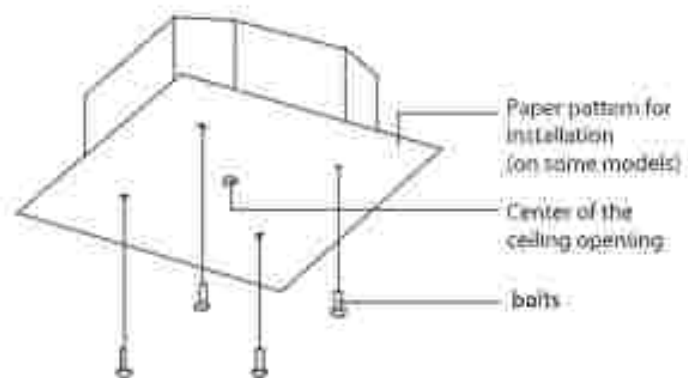
(8)

**NOTE:** The bottom of the unit should be 10-25mm(0.4-0.98") higher than the ceiling board. Generally, L (indicated in the following figure) should be half the length of the suspension bolt or long enough to prevent the nuts from coming off.



#### NOTE FOR NEW HOME INSTALLATION

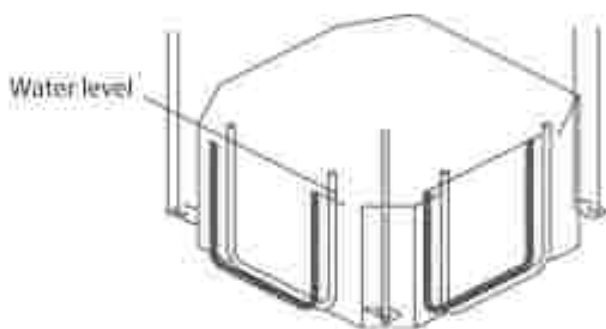
When installing the unit in a new home, the ceiling hooks can be embedded in advance. Make sure that the hooks do not come loose due to concrete shrinkage. After installing the indoor unit, fasten the installation paper template onto the unit with bolts to determine in advance the dimension and position of the opening on the ceiling. Follow the instructions above for the remainder of the installation.



#### CAUTION

Ensure that the unit is completely level. Improper installation can cause the drain pipe to back up into the unit or water leakage.

**NOTE:** Ensure that the indoor unit is level. The unit is equipped with a built-in drain pump and float switch. If the unit is tilted against the direction of condensate flows (the drainpipe side is raised), the float switch may malfunction and cause water to leak. (for some models)

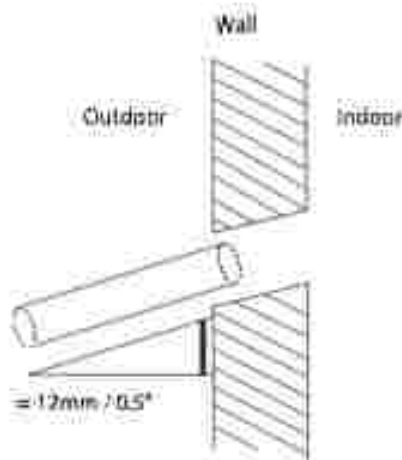


#### Step 3: Drill wall hole for connective piping

1. Determine the location of the wall hole based on the location of the outdoor unit.
2. Using a 65mm (2.56") or 90mm(3.54") (depending on models) core drill, drill a hole in the wall. Make sure that the hole is drilled at a slight downward angle, so that the outdoor end of the hole is lower than the indoor end by about 12mm (0.5"). This will ensure proper water drainage.
3. Place the protective wall cuff in the hole. This protects the edges of the hole and will help seal it when you finish the installation process.

## CAUTION

When drilling the wall hole, make sure to avoid wires, plumbing, and other sensitive.



### Step 4: Connect drain hose

The drainpipe is used to drain water away from the unit. Improper installation may cause unit and property damage.

## CAUTION

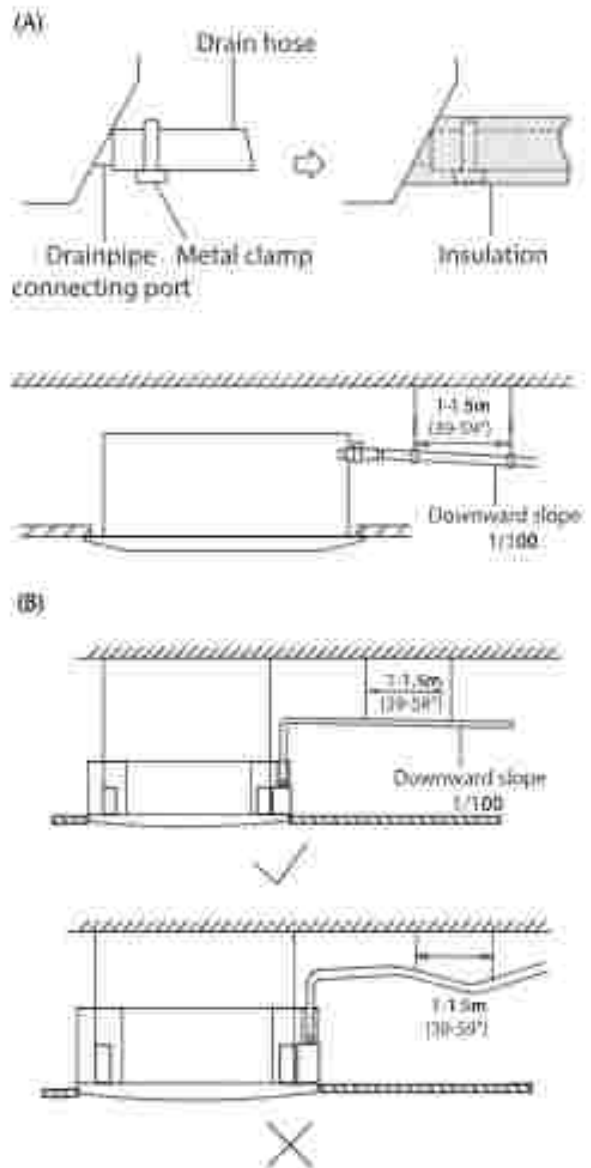
- Insulate all piping to prevent condensation, which could lead to water damage.
- If the drainpipe is bent or installed incorrectly, water may leak and cause a water-level switch malfunction.
- In HEAT mode, the outdoor unit will discharge water. Ensure that the drain hose is placed in an appropriate area to avoid water damage and slippage.
- **DO NOT** pull the drainpipe forcefully. This could disconnect it.

### NOTE ON PURCHASING PIPES

Installation requires a polyethylene tube (exterior diameter = 2.5cm or 3.7-3.9cm) (depending on models), which can be obtained at your local hardware store or dealer.

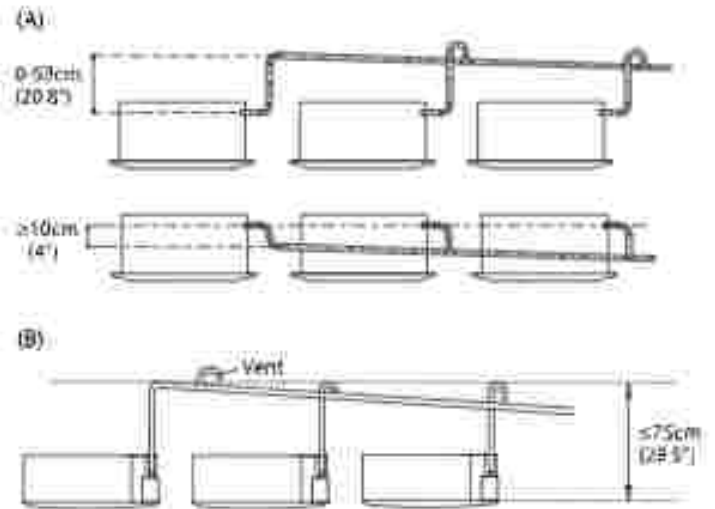
## Indoor Drainpipe Installation

Install the drainpipe as illustrated in the following Figure.



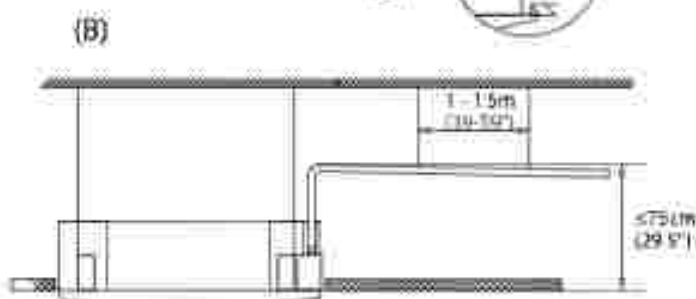
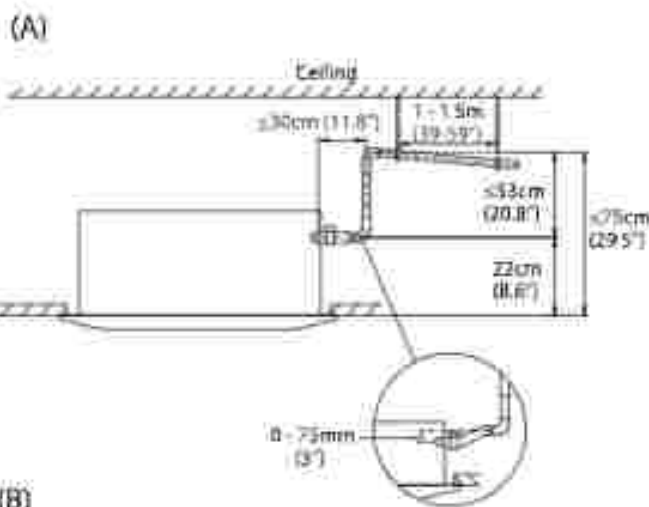
## NOTE ON DRAINPIPE INSTALLATION

- When using an extended drainpipe, tighten the indoor connection with an additional protection tube to prevent it from pulling loose.
- The drainpipe should slope downward at a gradient of at least 1/100 to prevent water from flowing back into the air conditioner.
- To prevent the pipe from sagging, space hanging wires every 1-1.5m (39-59").
- If the outlet of the drainpipe is higher than the body's pump joint, provide a lift pipe for the exhaust outlet of the indoor unit. The lift pipe must be installed no higher than 75cm (29.5") from the ceiling board and the distance between the unit and the lift pipe must be less than 30cm (11.8") (depending on models).
- To prevent air bubbles, keep the drain hose level or slightly tilted up (<75mm / 3") (some models).



Pass the drain hose through the wall hole. Make sure the water drains to a safe location where it will not cause water damage or a slipping hazard.

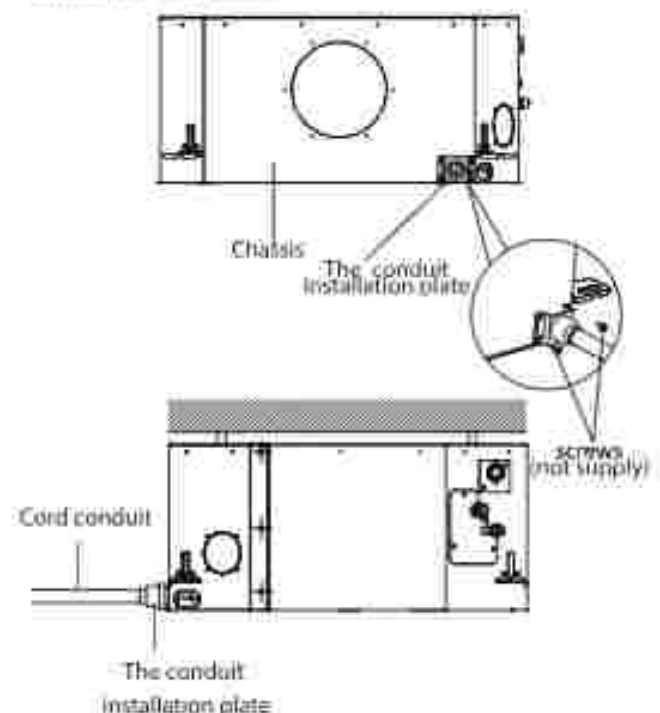
**NOTE:** The drainpipe outlet should be at least 5cm (1.9") above the ground. If it touches the ground, the unit may become blocked and malfunction. If you discharge the water directly into a sewer, make sure that the drain has a U or S pipe to catch odors that might otherwise come back into the house.



**NOTE:** When connecting multiple drainpipes, install the pipes as illustrated in the following figure.

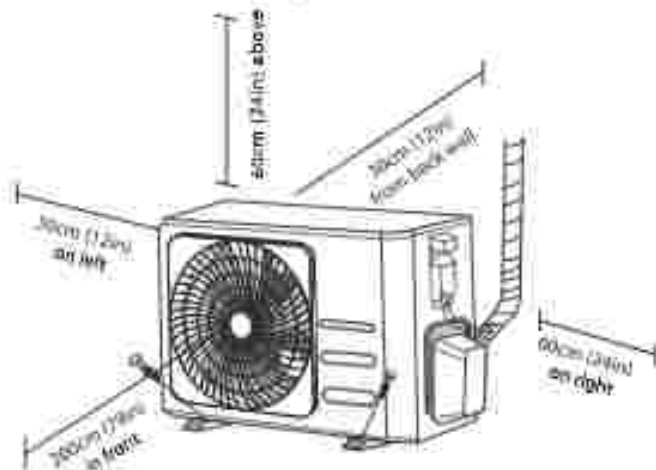
How to install the conduit installation plate (if supplied)

1. Fix the sheath connector (not supply) on the wire hole of the conduit installation plate.
2. Fix the the conduit installation plate on the chassis of the unit.



# Outdoor Unit Installation

Install the unit by following local codes and regulations, there may be differ slightly between different regions.



## Installation Instructions – Outdoor unit

### Step 1: Select installation location

Before installing the outdoor unit, you must choose an appropriate location. The following are standards that will help you choose an appropriate location for the unit.

#### Proper installation locations meet the following standards:

- Meets all spatial requirements shown in Installation Space Requirements above.
- Good air circulation and ventilation.
- Firm and solid—the location can support the unit and will not vibrate.
- Noise from the unit will not disturb others.
- Protected from prolonged periods of direct sunlight or rain.
- Where snowfall is anticipated, take appropriate measures to prevent ice buildup and coil damage.

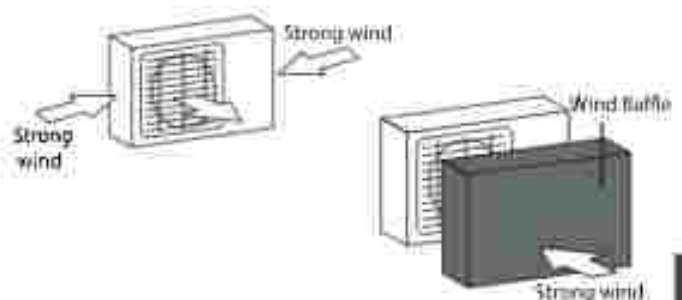
#### **DO NOT** install unit in the following locations:

- Near an obstacle that will block air inlets and outlets.
- Near a public street, crowded areas, or where noise from the unit will disturb others.
- Near animals or plants that will be harmed by hot air discharge.
- Near any source of combustible gas.
- In a location that is exposed to large amounts of dust.
- In a location exposed to a excessive amounts of salty air.

#### SPECIAL CONSIDERATIONS FOR EXTREME WEATHER

##### If the unit is exposed to heavy wind:

Install unit so that air outlet fan is at a 90° angle to the direction of the wind. If needed, build a barrier in front of the unit to protect it from extremely heavy winds. See Figures below.



##### If the unit is frequently exposed to heavy rain or snow:

Build a shelter above the unit to protect it from the rain or snow. Be careful not to obstruct air flow around the unit.

##### If the unit is frequently exposed to salty air (seaside):

Use outdoor unit that is specially designed to resist corrosion.

## Step 2: Install drain joint(Heat pump unit only)

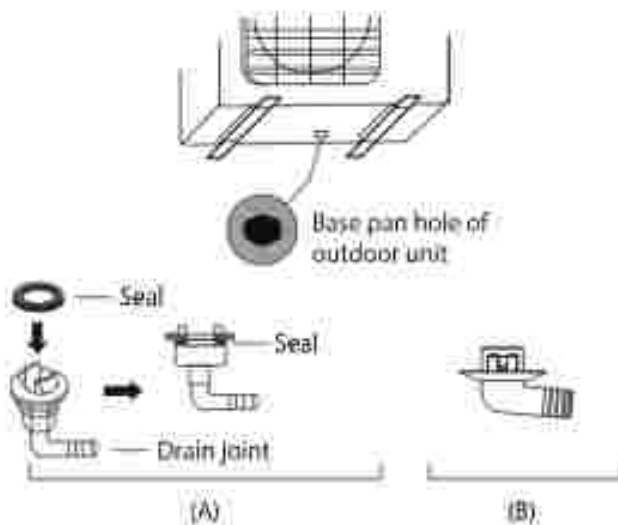
Before bolting the outdoor unit in place, you must install the drain joint at the bottom of the unit. Note that there are two different types of drain joints depending on the type of outdoor unit.

**If the drain joint comes with a rubber seal** (see Fig. A), do the following:

1. Fit the rubber seal on the end of the drain joint that will connect to the outdoor unit.
2. Insert the drain joint into the hole in the base pan of the unit.
3. Rotate the drain joint 90° until it clicks in place facing the front of the unit.
4. Connect a drain hose extension (not included) to the drain joint to redirect water from the unit during heating mode.

**If the drain joint doesn't come with a rubber seal** (see Fig. B), do the following:

1. Insert the drain joint into the hole in the base pan of the unit. The drain joint will click in place.
2. Connect a drain hose extension (not included) to the drain joint to redirect water from the unit during heating mode.



## Step 3: Anchor outdoor unit

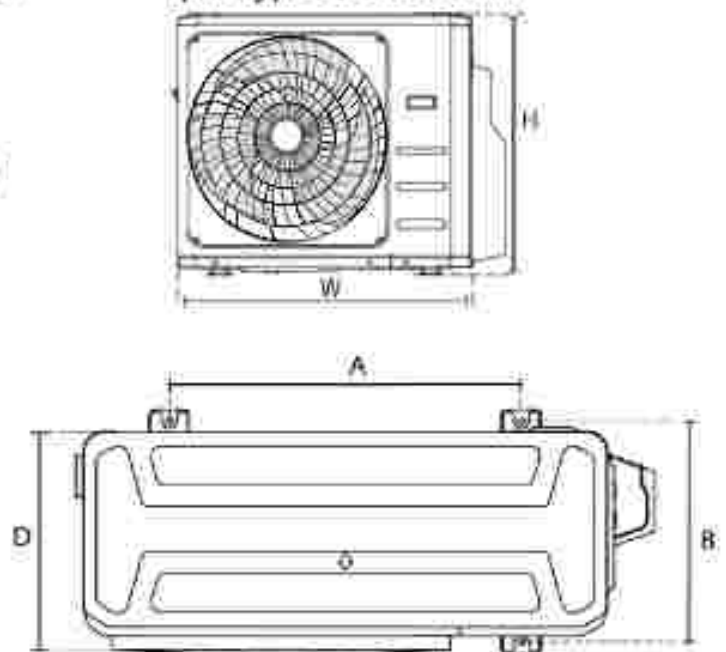
The outdoor unit can be anchored to the ground or to a wall-mounted bracket with bolt(M10). Prepare the installation base of the unit according to the dimensions below.

### UNIT MOUNTING DIMENSIONS

The following is a list of different outdoor unit sizes and the distance between their mounting feet. Prepare the installation base of the unit according to the dimensions below.

#### Outdoor Unit Types and Specifications

##### Split Type Outdoor Unit



### ! IN COLD CLIMATES

In cold climates, make sure that the drain hose is as vertical as possible to ensure swift water drainage. If water drains too slowly, it can freeze in the hose and flood the unit.

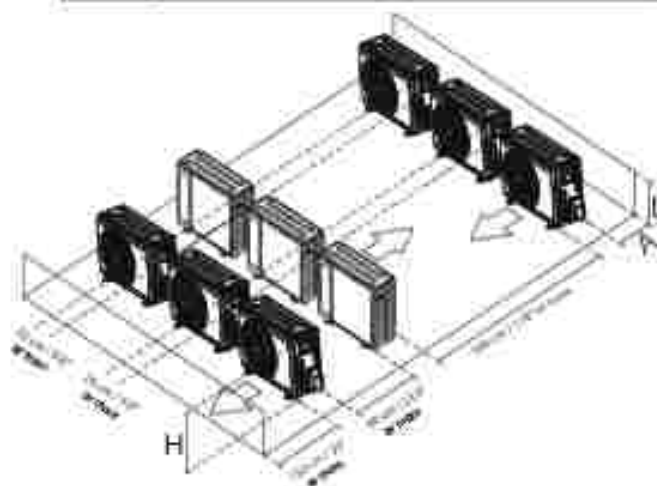
(unit: mm/inch)

### Rows of series installation

Outdoor Unit Dimensions W x H x D	Mounting Dimensions	
	Distance A	Distance B
946x810x420 (37.24x31.9x16.53)	673 (26.5)	403 (15.87)
890x673x342 (35x26.5x13.46)	663 (26.1)	354 (13.94)

The relations between H, A and L are as follows.

	L	A
$L \leq H$	$L \leq 1/2H$	25 cm / 9.8" or more
	$1/2H < L \leq H$	30 cm / 11.8" or more
$L > H$	Can not be installed	



# Refrigerant Piping Connection

When connecting refrigerant piping, **do not** let substances or gases other than the specified refrigerant enter the unit. The presence of other gases or substances will lower the unit's capacity, and can cause abnormally high pressure in the refrigeration cycle. This can cause explosion and injury.

## Note on Pipe Length

Ensure that the length of the refrigerant pipe, the number of bends, and the drop height between the indoor and outdoor units meets the requirements shown in the following table :

The Maximum Length And Drop Height Based on Models. (Unit: m/ft.)

Type of model	Capacity (Btu/h)	Length of piping	Maximum drop height
KLMHS40-AA1M32	35k - 48k	33/98.4	20/65.6
KLMHS60-AA1M32	48k - 60k	50/154	30/98.4

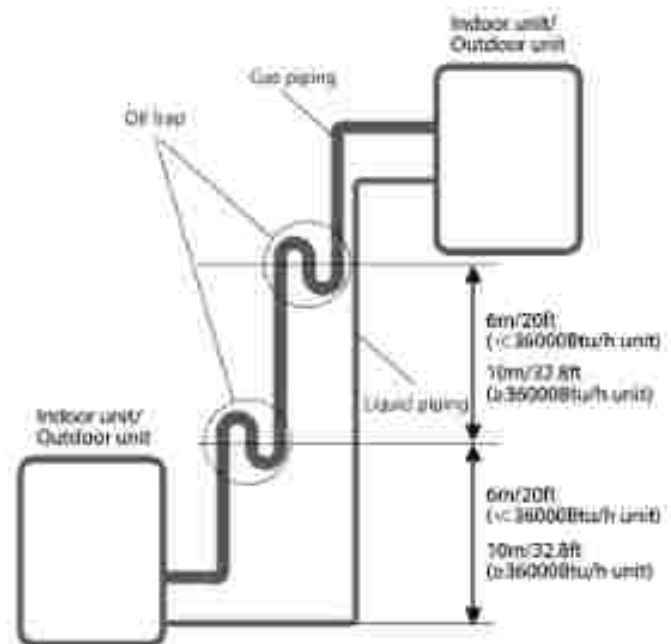
### CAUTION

#### Oil traps

If oil flows back into the outdoor unit's compressor, this might cause liquid compression or deterioration of oil return. Oil traps in the rising gas piping can prevent this.

An oil trap should be installed every 6m(20ft) of vertical suction line riser (< 36000Btu/h unit).

An oil trap should be installed every 10m(32.8ft) of vertical suction line riser (≥ 36000Btu/h unit).



## Connection Instructions – Refrigerant Piping

### CAUTION

- The branching pipe must be installed horizontally. An angle of more than 10° may cause malfunction.
- **DO NOT** install the connecting pipe until both indoor and outdoor units have been installed.
- Insulate both the gas and liquid piping to prevent water leakage.

### Step 1: Cut pipes

When preparing refrigerant pipes, take extra care to cut and flare them properly. This will ensure efficient operation and minimize the need for future maintenance.

1. Measure the distance between the indoor and outdoor units.
2. Using a pipe cutter, cut the pipe a little longer than the measured distance.
3. Make sure that the pipe is cut at a perfect 90° angle.



### DO NOT DEFORM PIPE WHILE CUTTING

Be extra careful not to damage, dent, or deform the pipe while cutting. This will drastically reduce the heating efficiency of the unit.

### Step 2: Remove burrs.

Burrs can affect the air-tight seal of refrigerant piping connection. They must be completely removed.

1. Hold the pipe at a downward angle to prevent burrs from falling into the pipe.

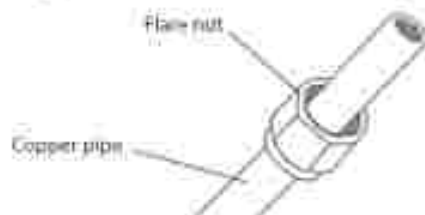
2. Using a reamer or deburring tool, remove all burrs from the cut section of the pipe.



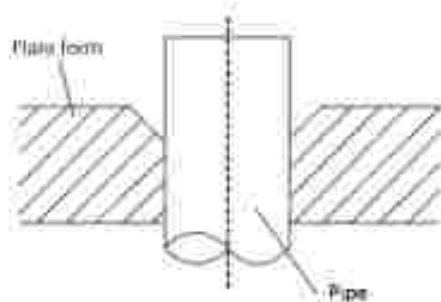
### Step 3: Flare pipe ends

Proper flaring is essential to achieve an airtight seal.

1. After removing burrs from cut pipe, seal the ends with PVC tape to prevent foreign materials from entering the pipe.
2. Sheath the pipe with insulating material.
3. Place flare nuts on both ends of pipe. Make sure they are facing in the right direction, because you can't put them on or change their direction after flaring.



4. Remove PVC tape from ends of pipe when ready to perform flaring work.
5. Clamp flare form on the end of the pipe. The end of the pipe must extend beyond the flare form.



6. Place flaring tool onto the form.
7. Turn the handle of the flaring tool clockwise until the pipe is fully flared. Flare the pipe in accordance with the dimensions.

## PIPING EXTENSION BEYOND FLARE FORM

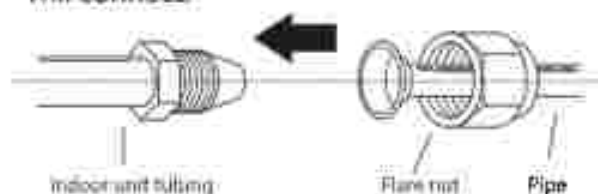
Pipe gauge	Tightening torque	Flare dimension (A) (Unit: mm/inch)		Flare shape
		Min.	Max.	
Ø6.35 (Ø 1/4")	18-20 N.m (130-200kgf.cm)	8.4/0.33	8.7/0.34	
Ø9.52 (Ø 3/8")	32-35 N.m (230-260kgf.cm)	13.2/0.52	13.5/0.53	
Ø12.7 (Ø 1/2")	45-55 N.m (330-400kgf.cm)	16.2/0.64	16.5/0.65	
Ø16 (Ø 5/8")	57-71 N.m (420-520kgf.cm)	19.2/0.76	19.7/0.78	
Ø19 (Ø 3/4")	62-101 N.m (450-750kgf.cm)	23.2/0.91	23.7/0.93	
Ø22 (Ø 7/8")	85-110 N.m (620-800kgf.cm)	26.4/1.04	26.9/1.06	

- Remove the flaring tool and flare form, then inspect the end of the pipe for cracks and even flaring.

### Step 4: Connect pipes

Connect the copper pipes to the indoor unit first, then connect it to the outdoor unit. You should first connect the low-pressure pipe, then the high-pressure pipe.

- When connecting the flare nuts, apply a thin coat of refrigeration oil to the flared ends of the pipes.
- Align the center of the two pipes that you will connect.



- Tighten the flare nut as tightly as possible by hand.
- Using a spanner, grip the nut on the unit tubing.
- While firmly gripping the nut, use a torque wrench to tighten the flare nut according to the torque values in above table.

**NOTE:** Use both a spanner and a torque wrench when connecting or disconnecting pipes to/from the unit.



## CAUTION

- Ensure to wrap insulation around the piping. Direct contact with the bare piping may result in burns or frostbite.
- Make sure the pipe is properly connected. Over tightening may damage the bell mouth and under tightening may lead to leakage.

## NOTE ON MINIMUM BEND RADIUS

Carefully bend the tubing in the middle according to the diagram below. **DO NOT** bend the tubing more than 90° or more than 3 times.

Bend the pipe with thumb



min-radius 10cm (3.9")

- After connecting the copper pipes to the indoor unit, wrap the power cable, signal cable and the piping together with binding tape.

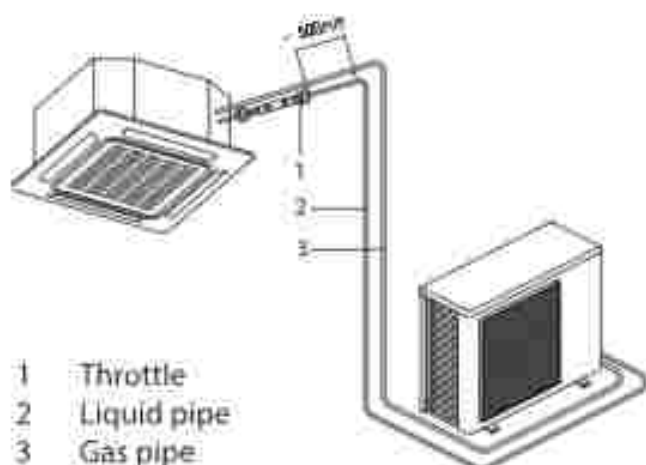
**NOTE: DO NOT** intertwine signal cable with other wires. While bundling these items together, do not intertwine or cross the signal cable with any other wiring.

- Thread this pipeline through the wall and connect it to the outdoor unit.
- Insulate all the piping, including the valves of the outdoor unit.
- Open the stop valves of the outdoor unit to start the flow of the refrigerant between the indoor and outdoor unit.

## CAUTION

Check to make sure there is no refrigerant leak after completing the installation work. If there is a refrigerant leak, ventilate the area immediately and evacuate the system (refer to the Air Evacuation section of this manual).

## Installation Of The Throttle. (Some Models)



- 1 Throttle
- 2 Liquid pipe
- 3 Gas pipe

### Precautions

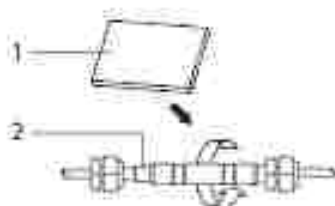
- For ensuring throttled efficiency, please mount the throttle as horizontally as possible.

Indoor  Outdoor

Indoor  Outdoor

Indoor  Outdoor

- Wrap the supplied anti-shock rubber at external of the throttle for denoise.



- 1 Anti-shock rubber
- 2 Throttle

## Wiring

### **!** BEFORE PERFORMING ANY ELECTRICAL WORK, READ THESE REGULATIONS

1. All wiring must comply with local and national electrical codes, regulations and must be installed by a licensed electrician.
2. All electrical connections must be made according to the Electrical Connection Diagram located on the panels of the indoor and outdoor units.
3. If there is a serious safety issue with the power supply, stop work immediately. Explain your reasoning to the client, and refuse to install the unit until the safety issue is properly resolved.
4. Power voltage should be within 90-110% of rated voltage. Insufficient power supply can cause malfunction, electrical shock, or fire.
5. If connecting power to fixed wiring, a surgeprotector and main power switch should be installed.
6. If connecting power to fixed wiring, a switch or circuit breaker that disconnects all poles and has a contact separation of at least 1/8in (3mm) must be incorporated in the fixed wiring. The qualified technician must use an approved circuit breaker or switch.
7. Only connect the unit to an individual branch circuit outlet. Do not connect another appliance to that outlet.
8. Make sure to properly ground the air conditioner.
9. Every wire must be firmly connected. Loose wiring can cause the terminal to overheat, resulting in product malfunction and possible fire.
10. Do not let wires touch or rest against refrigerant tubing, the compressor, or any moving parts within the unit.
11. If the unit has an auxiliary electric heater, it must be installed at least 1 meter (40in) away from any combustible materials.
12. To avoid getting an electric shock, never touch the electrical components soon after the power supply has been turned off. After turning off the power, always wait 10 minutes or more before you touch the electrical components.

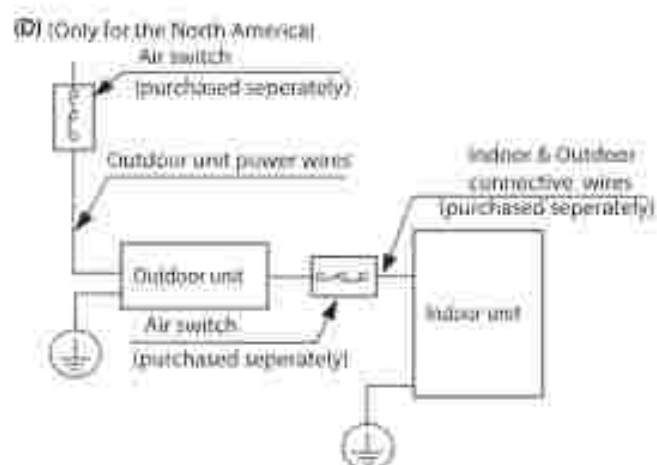
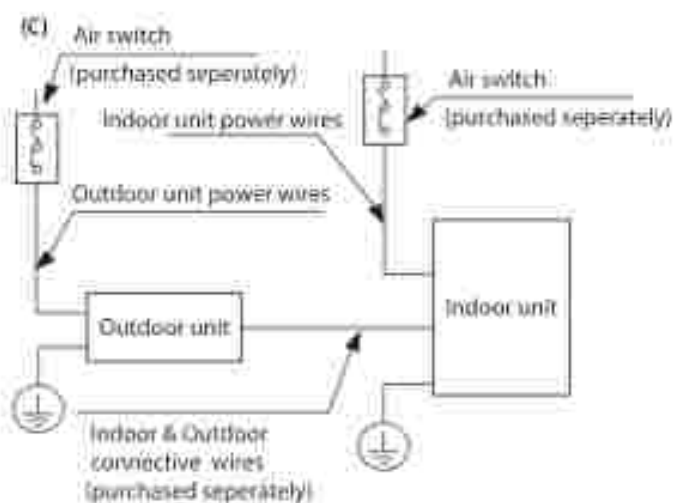
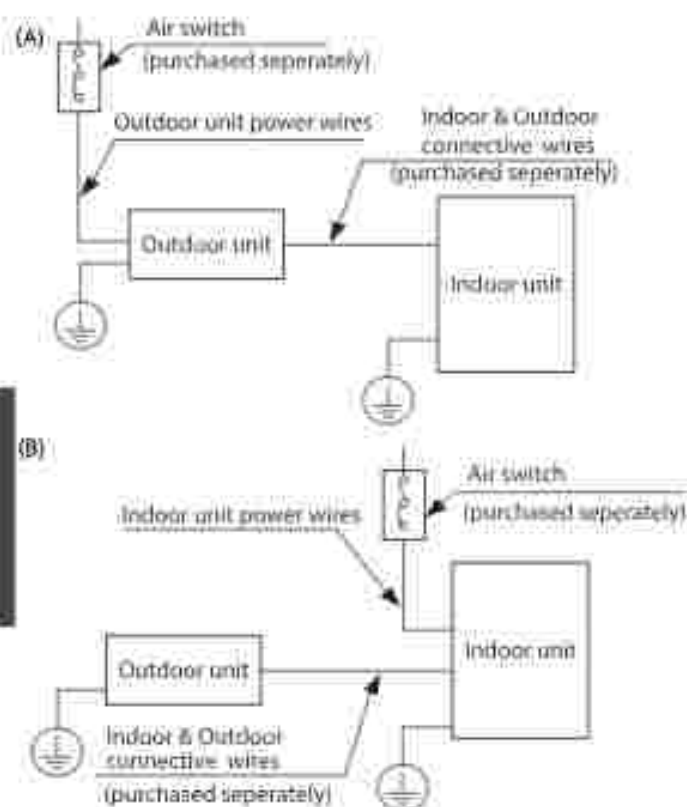
13. Make sure that you do not cross your electrical wiring with your signal wiring. This may cause distortion and interference.
14. The unit must be connected to the main outlet. Normally, the power supply must have a impedance of 32 ohms.
15. No other equipment should be connected to the same power circuit.
16. Connect the outdoor wires before connecting the indoor wires.

## WARNING

**BEFORE PERFORMING ANY ELECTRICAL OR WIRING WORK, TURN OFF THE MAIN POWER TO THE SYSTEM.**

### NOTE ON AIR SWITCH

When the maximum current of the air conditioner is more than 16A, an air switch or leakage protection switch with protective device shall be used (purchased separately). When the maximum current of the air conditioner is less than 16A, the power cord of air conditioner shall be equipped with plug (purchased separately). In North America, the appliance should be wired according to NEC and CEC requirements.



**NOTE:** The diagrams are for explanation purpose only. Your machine may be slightly different. The actual shape shall prevail.

### Outdoor Unit Wiring

## WARNING

Before performing any electrical or wiring work, turn off the main power to the system.

1. Prepare the cable for connection
  - a. You must first choose the right cable size. Be sure to use H07RN-F cables.

**NOTE:** In North America, choose the cable type according to the local electrical codes and regulations.

## Minimum Cross-Sectional Area of Power and Signal Cables (For reference)

Rated Current of Appliance (A)	Nominal Cross-Sectional Area (mm <sup>2</sup> )
>3 and ≤6	0.75
>6 and ≤10	1
>10 and ≤16	1.5
>16 and ≤25	2.5
>25 and ≤32	4
>32 and ≤40	6

### CHOOSE THE RIGHT CABLE SIZE

The size of the power supply cable, signal cable, fuse, and switch needed is determined by the maximum current of the unit. The maximum current is indicated on the nameplate located on the side panel of the unit. Refer to this nameplate to choose the right cable, fuse, or switch.

**NOTE:** In North America, please choose the right cable size according to the Minimum Circuit Ampacity indicated on the nameplate of the unit.

- Using wire strippers, strip the rubber jacket from both ends of the signal cable to reveal approximately 15cm (5.9") of wire.
- Strip the insulation from the ends.
- Using a wire crimper, crimp u-lugs on the ends.

**NOTE:** When connecting the wires, strictly follow the wiring diagram found inside the electrical box cover.

- Remove the 2 screws fixed on the front panel and side panel, then take it down to perform wire connection (see the figure of outdoor unit A).  
Unscrew the electrical wiring cover and remove it. (see the figure of outdoor unit B)



- Connect the u-lugs to the terminals. Match the wire colors/labels with the labels on the terminal block. Firmly screw the u-lug of each wire to its corresponding terminal.
- Clamp down the cable with the cable clamp.
- Insulate unused wires with electrical tape. Keep them away from any electrical or metal parts.
- Reinstall the cover of the electric control box.

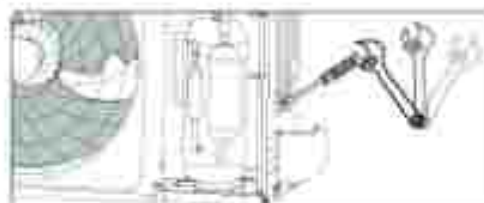
### Australia models

Please prepare spanner and flat-blade screwdriver before your installation work.

- Remove two fixing screws, then remove the front panel.

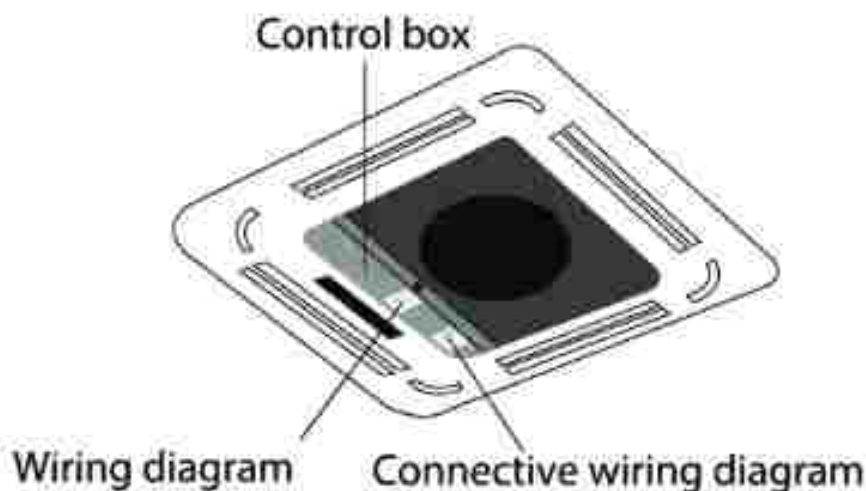
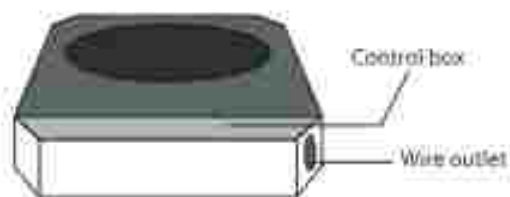


- Use spanner and flat-blade screwdriver to knock down two metal seals, then pick the metal flakes out.

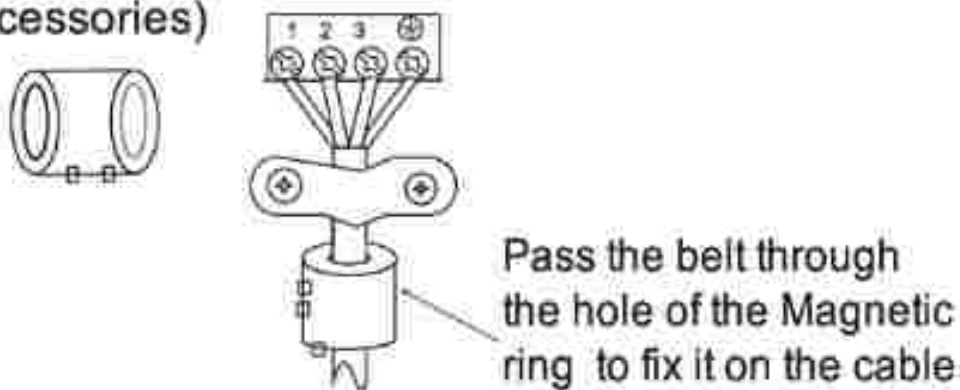


3. Connect the power cable and indoor & outdoor connection cable. Clamp down the cable with the cable clamp.
4. The wire groups shall be bound with cable ties and fixed on the right side plate after they are connected. The strong electric wire group and weak electric wire group shall be fed out separately through the two knock down holes on the bottom of the right side plate and fastened with a locking connector as shown in the figure below.

### Super-Slim models



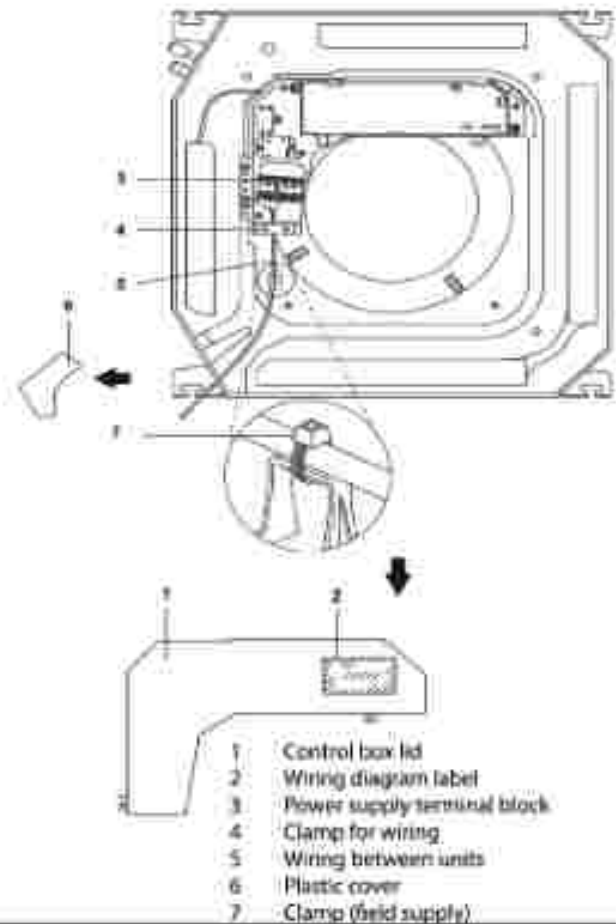
### Magnetic ring (if supplied and packed with the accessories)



NOTE: The actual shape of your unit may be slightly different. The actual shape shall prevail.

## Indoor Unit Wiring

1. Prepare the cable for connection
  - a. Using wire strippers, strip the rubber jacket from both ends of the signal cable to reveal about 15cm (5.9") of the wire.
  - b. Strip the insulation from the ends of the wires.
  - c. Using a wire crimper, crimp the u-lugs to the ends of the wires.
2. Open the front panel of the indoor unit. Using a screwdriver, remove the cover of the electric control box on your indoor unit.
3. Thread the power cable and the signal cable through the wire outlet.
4. Connect the u-lugs to the terminals.  
Match the wire colors/labels with the labels on the terminal block. Firmly screw the u-lug of each wire to its corresponding terminal. Refer to the Serial Number and Wiring Diagram located on the cover of the electric control box.



## ⚠ CAUTION

- While connecting the wires, please strictly follow the wiring diagram.
- The refrigerant circuit can become very hot. Keep the interconnection cable away from the copper tube.

5. Clamp down the cable with the cable clamp. The cable must not be loose or pull on the u-lugs.
6. Reattach the electric box cover.

## Power Specifications (Not applicable for North America)

**NOTE:** Electric auxiliary heating type circuit breaker/fuse need to add more than 10 A.

## Inverter Type A/C Power Specification

MODEL(Btu/h)		KLM-IC40-AA1M32	KLM-IC60-AA1M32
POWER Indoor	PHASE	1 Phase	1 Phase
	VOLT	230V	230V
POWER Outdoor	PHASE	1 Phase	1 Phase
	VOLT	230V	230V
CIRCUIT BREAKER/		40 A	60 A

# Air Evacuation

## Preparations and Precautions

Air and foreign matter in the refrigerant circuit can cause abnormal rises in pressure, which can damage the air conditioner, reduce its efficiency, and cause injury. Use a vacuum pump and manifold gauge to evacuate the refrigerant circuit, removing any non-condensable gas and moisture from the system.

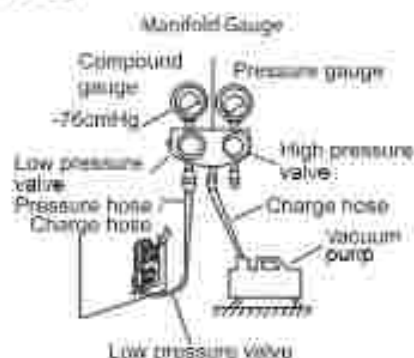
Evacuation should be performed upon initial installation and when unit is relocated.

## BEFORE PERFORMING EVACUATION

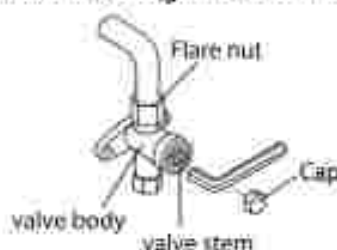
- ☑ Check to make sure the connective pipes between the indoor and outdoor units are connected properly.
- ☑ Check to make sure all wiring is connected properly.

## Evacuation Instructions

1. Connect the charge hose of the manifold gauge to service port on the outdoor unit's low pressure valve.
2. Connect another charge hose from the manifold gauge to the vacuum pump.
3. Open the Low Pressure side of the manifold gauge. Keep the High Pressure side closed.
4. Turn on the vacuum pump to evacuate the system.
5. Run the vacuum for at least 15 minutes, or until the Compound Meter reads -76cmHG (-10<sup>5</sup>Pa).



6. Close the Low Pressure side of the manifold gauge, and turn off the vacuum pump.
7. Wait for 5 minutes, then check that there has been no change in system pressure.
8. If there is a change in system pressure, refer to Gas Leak Check section for information on how to check for leaks. If there is no change in system pressure, unscrew the cap from the packed valve (high pressure valve).
9. Insert hexagonal wrench into the packed valve (high pressure valve) and open the valve by turning the wrench in a 1/4 counterclockwise turn. Listen for gas to exit the system, then close the valve after 5 seconds.
10. Watch the Pressure Gauge for one minute to make sure that there is no change in pressure. The Pressure Gauge should read slightly higher than atmospheric pressure.
11. Remove the charge hose from the service port.



12. Using hexagonal wrench, fully open both the high pressure and low pressure valves.
13. Tighten valve caps on all three valves (service port, high pressure, low pressure) by hand. You may tighten it further using a torque wrench if needed.

## ⚠ OPEN VALVE STEMS GENTLY

When opening valve stems, turn the hexagonal wrench until it hits against the stopper. Do not try to force the valve to open further.

## Note on Adding Refrigerant

Some systems require additional charging depending on pipe lengths. The standard pipe length varies according to local regulations. For example, in North America, the standard pipe length is 7.5m (25'). In other areas, the standard pipe length is 5m (16'). The refrigerant should be charged from the service port on the outdoor unit's low pressure valve. The additional refrigerant to be charged can be calculated using the following formula:

### Liquid Side Diameter

	φ6.35(1/4")	φ9.52(3/8")	φ12.7(1/2")
<b>R22 (orifice tube in the indoor unit):</b>	(Total pipe length - standard pipe length) x 30g (0.32oz)/m(ft)	(Total pipe length - standard pipe length) x 65g (0.69oz)/m(ft)	(Total pipe length - standard pipe length) x 115g (1.23oz)/m(ft)
<b>R22 (orifice tube in the outdoor unit):</b>	(Total pipe length - standard pipe length) x 15g (0.16oz)/m(ft)	(Total pipe length - standard pipe length) x 30g (0.32oz)/m(ft)	(Total pipe length - standard pipe length) x 60g (0.64oz)/m(ft)
<b>R410A: (orifice tube in the indoor unit):</b>	(Total pipe length - standard pipe length) x 30g (0.32oz)/m(ft)	(Total pipe length - standard pipe length) x 65g (0.69oz)/m(ft)	(Total pipe length - standard pipe length) x 115g (1.23oz)/m(ft)
<b>R410A: (orifice tube in the outdoor unit):</b>	(Total pipe length - standard pipe length) x 15g (0.16oz)/m(ft)	(Total pipe length - standard pipe length) x 30g (0.32oz)/m(ft)	(Total pipe length - standard pipe length) x 65g (0.69oz)/m(ft)
<b>R32 :</b>	(Total pipe length - standard pipe length) x 12g (0.13oz)/m(ft)	(Total pipe length - standard pipe length) x 24g (0.26oz)/m(ft)	(Total pipe length - standard pipe length) x 40g (0.42oz)/m(ft)



**CAUTION** DO NOT mix refrigerant types.

## Panel Installation

### CAUTION

**DO NOT** place the panel facedown on the floor, against a wall, or on uneven surfaces.

(A)

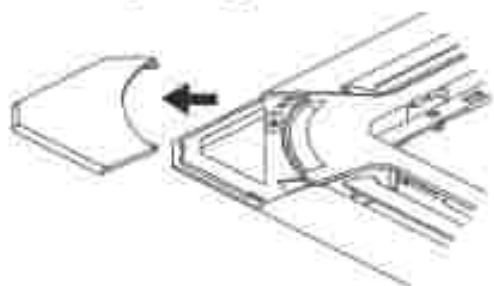
#### Super-Slim models

##### Step 1: Remove the front grille.

1. Push both of the tabs towards the middle simultaneously to unlock the hook on the grille.
2. Hold the grille at a 45° angle, lift it up slightly and detach it from the main body.



##### Step 2: Remove the installation covers at the four corners by sliding them outwards.

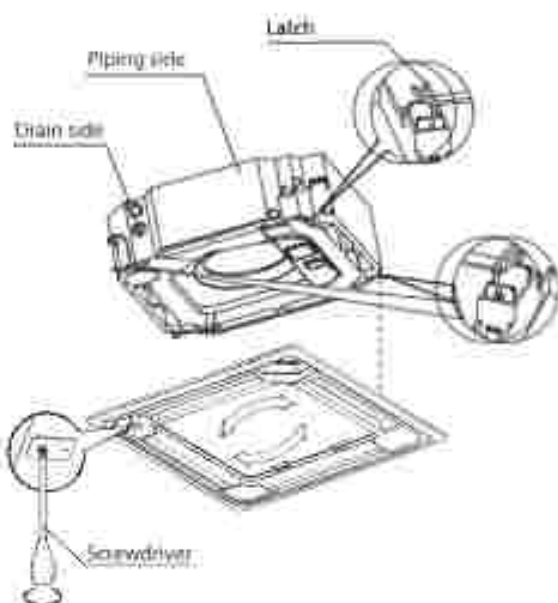


##### Step 3: Install the panel

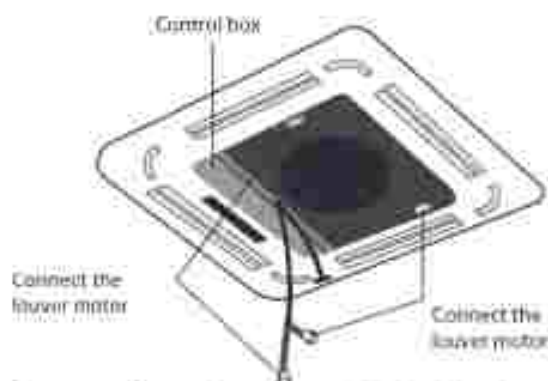
Align the front panel to the main body, taking into account the position of the piping and drain sides. Hang the four latches of the decorative panel to the hooks of the indoor unit. Tighten the panel hook screws evenly at the four corners.

**NOTE:** Tighten the screws until the thickness of the sponge between the main body and the panel reduces to 4-6mm (0.2-0.3"). The edge of the panel should be in contact with the ceiling well.

Adjust the panel by turning it to the arrowed direction so that the ceiling opening is completely covered.

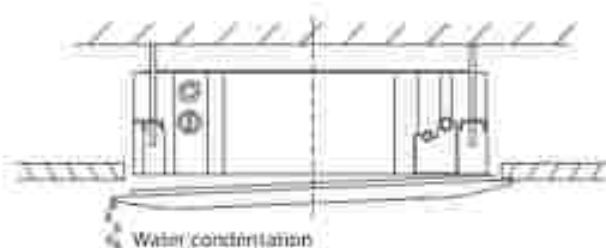


1. Connect the two louver motor connectors to the corresponding wires in the control box.



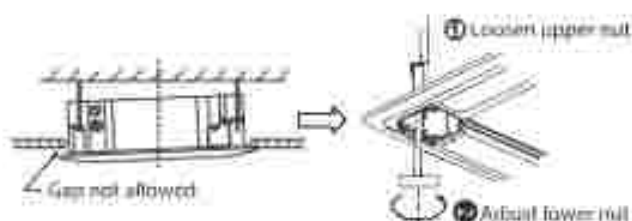
2. Remove foam stops from inside the fan.
3. Attach the side of the front grille to the panel.
4. Connect the display panel cable to the corresponding wire on the main body.
5. Close the front grille.
6. Fasten the installation covers at all four corners by pushing them inwards.

**NOTE:** If the height of the indoor unit needs to be adjusted, you can do so through the openings at the panel's four corners. Make sure that the internal wiring and drainpipe are not affected by this adjustment.



### CAUTION

Failure to tighten screws can cause water leakage.



### CAUTION

If the unit is not hung correctly and a gap exists, the unit's height must be adjusted to ensure proper function. The unit's height can be adjusted by loosening the upper nut, and adjusting the lower nut.

## Compact models

### Step 1: Remove the front grille.

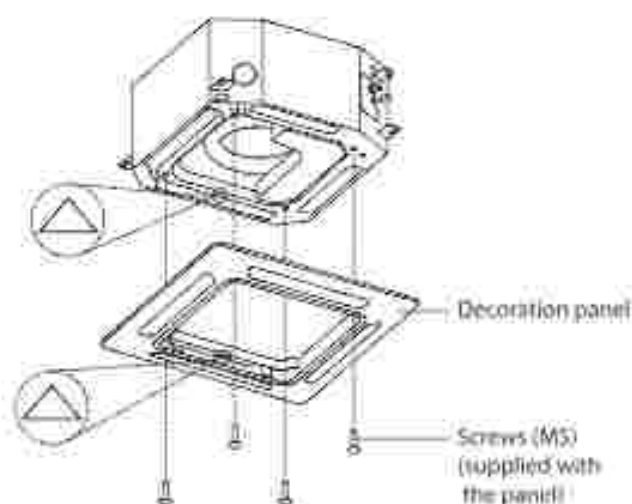
1. Push both of the tabs towards the middle simultaneously to unlock the hook on the grille.



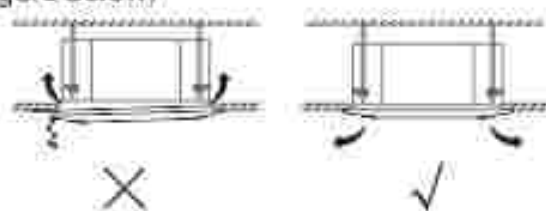
2. Hold the grille at a 45° angle, lift it up slightly and detach it from the main body.

### Step 2: Install the panel

Align the indicate "△" on the decoration panel to the indicate "△" on the unit.  
Attach the decoration panel to the unit with the supplied screws as shown in figure below.

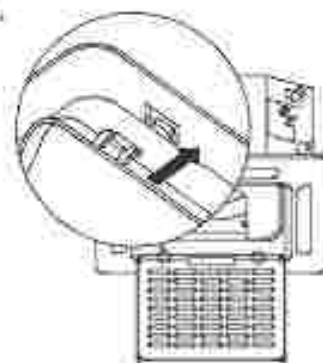


After installing the decoration panel, ensure that there is no space between the unit body and decoration panel. Otherwise air may leak through the gap and cause dewdrop. (See figure below)

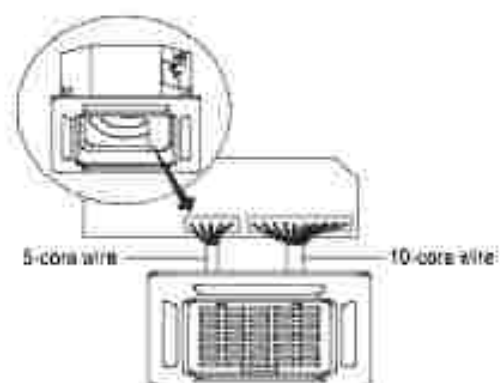


### Step 3: Mount the intake grille.

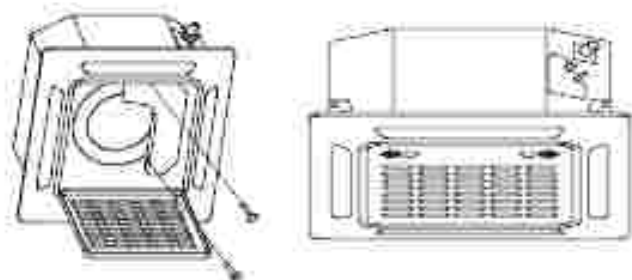
Ensure that the buckles at the back of the grille be properly seated in the groove of the panel.



### Step 4: Connect the 2 wires of the decoration panel to the mainboard of the unit.



**Step 5: Fasten the control box lid with 2 screws.**

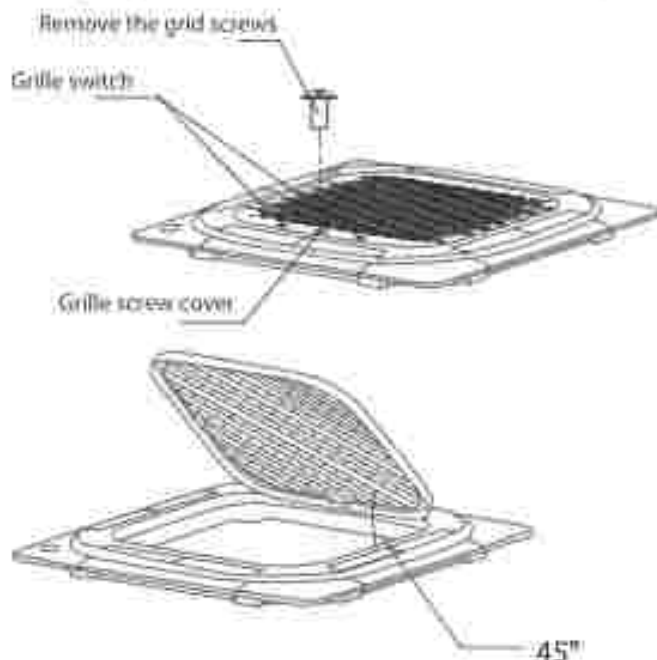


**Step 6: Close the intake grille, and close the 2 grille hooks.**

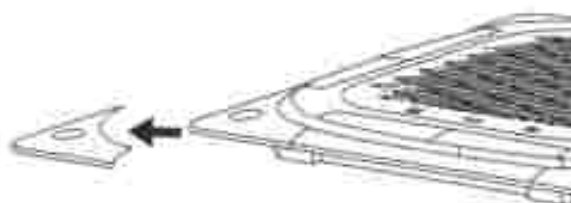
(B)

**Step 1: Remove the front grille.**

1. Push both of the tabs towards the middle simultaneously to unlock the hook on the grille.
2. Hold the grille at a 45° angle, lift it up slightly and detach it from the main body.



**Step 2: Remove the installation covers at the four corners by sliding them outwards.**

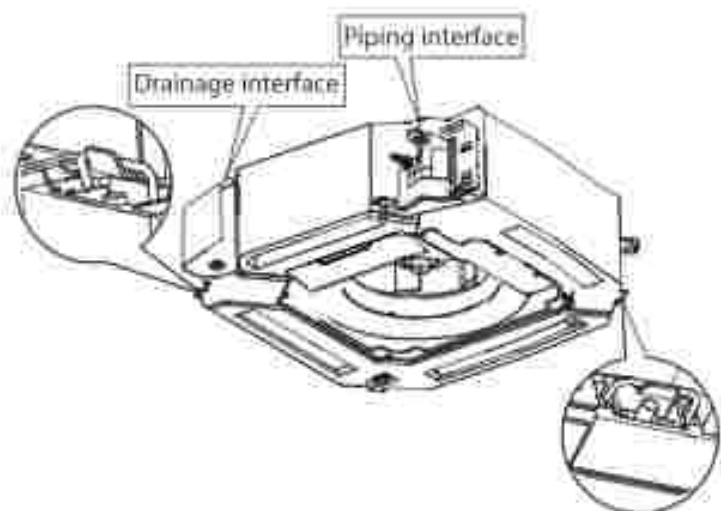


**Step 3: Install the panel**

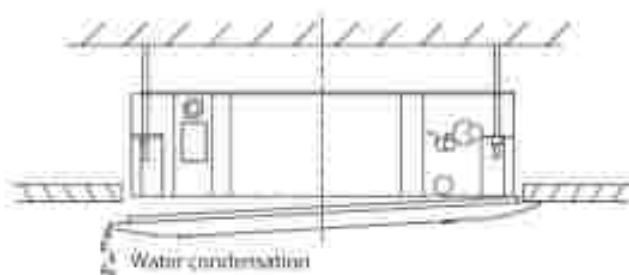
Align the front panel to the main body, taking into account the position of the piping and drain sides. Hang the four latches of the decorative panel to the hooks of the indoor unit. Tighten the panel hook screws evenly at the four corners.

**NOTE:** Tighten the screws until the thickness of the sponge between the main body and the panel reduces to 4-6mm (0.2-0.3"). The edge of the panel should be in contact with the ceiling well.

Adjust the panel by turning it to the arrowed direction so that the ceiling opening is completely covered.

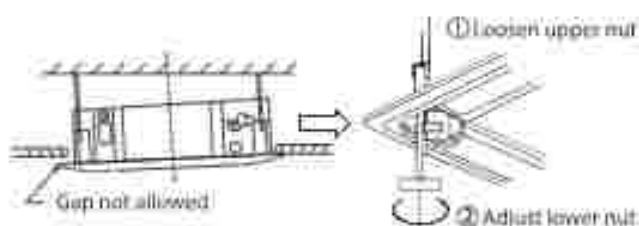
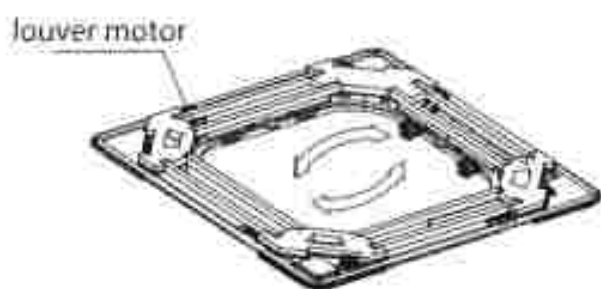


**NOTE:** If the height of the indoor unit needs to be adjusted, you can do so through the openings at the panel's four corners. Make sure that the internal wiring and drainpipe are not affected by this adjustment.



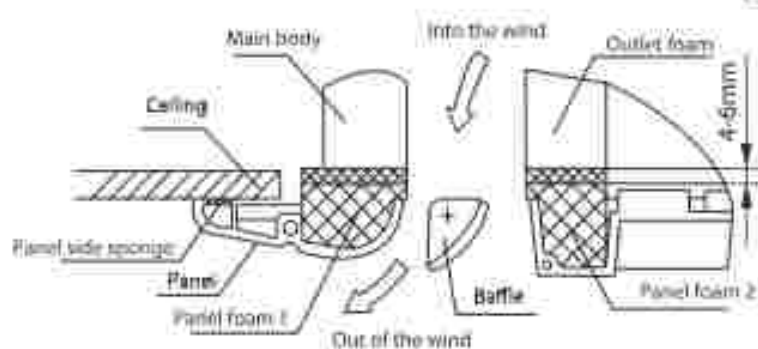
**CAUTION**

Failure to tighten screws can cause water leakage.

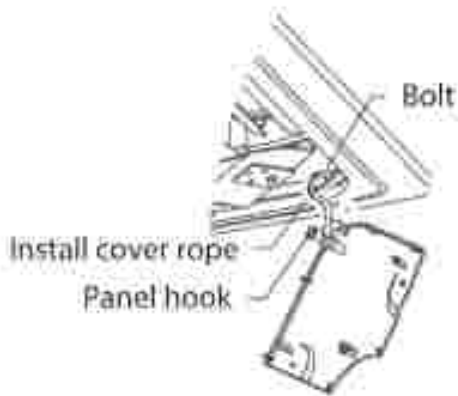


**CAUTION**

If the unit is not hung correctly and a gap exists, the unit's height must be adjusted to ensure proper function. The unit's height can be adjusted by loosening the upper nut, and adjusting the lower nut.



Hang the intake grille on the panel, and then connect the lead connectors of the louver motor and the control box on the panel to the corresponding connectors of the main body.



Re-installed into the style grid.  
Reinstall the installation cover.  
Fix the installation cover plate rope to the pillar of the installation cover plate, and gently press the installation cover plate into the panel.



When installing the cover, slide the four slide fasteners into the corresponding slots on the panel.

**NOTE:** After installation, the butt plugs of display, swing, water pump and other wire bodies must be placed in the electric control box.

# Test Run

## Before Test Run

A test run must be performed after the entire system has been completely installed. Confirm the following points before performing the test:

- a) Indoor and outdoor units are properly installed.
- b) Piping and wiring are properly connected.
- c) No obstacles near the inlet and outlet of the unit that might cause poor performance or product malfunction.
- d) Refrigeration system does not leak.
- e) Drainage system is unimpeded and draining to a safe location.
- f) Heating insulation is properly installed.
- g) Grounding wires are properly connected.
- h) Length of the piping and additional refrigerant stow capacity have been recorded.
- i) Power voltage is the correct voltage for the air conditioner.



## CAUTION

Failure to perform the test run may result in unit damage, property damage, or personal injury.

## Test Run Instructions

1. Open both the liquid and gas stop valves.
2. Turn on the main power switch and allow the unit to warm up.
3. Set the air conditioner to COOL mode.
4. For the Indoor Unit
  - a. Ensure the remote control and its buttons work properly.
  - b. Ensure the louvers move properly and can be changed using the remote control.
  - c. Double check to see if the room temperature is being registered correctly.
  - d. Ensure the indicators on the remote control and the display panel on the indoor unit work properly.
  - e. Ensure the manual buttons on the indoor unit works properly.

- f. Check to see that the drainage system is unimpeded and draining smoothly.
  - g. Ensure there is no vibration or abnormal noise during operation.
5. For the Outdoor Unit
    - a. Check to see if the refrigeration system is leaking.
    - b. Make sure there is no vibration or abnormal noise during operation.
    - c. Ensure the wind, noise, and water generated by the unit do not disturb your neighbors or pose a safety hazard.
  6. Drainage Test
    - a. Ensure the drainpipe flows smoothly. New buildings should perform this test before finishing the ceiling.
    - b. Remove the test cover. Add 2,000ml of water to the tank through the attached tube.
    - c. Turn on the main power switch and run the air conditioner in COOL mode.
    - d. Listen to the sound of the drain pump to see if it makes any unusual noises.
    - e. Check to see that the water is discharged. It may take up to one minute before the unit begins to drain depending on the drainpipe.
    - f. Make sure that there are no leaks in any of the piping.
    - g. Stop the air conditioner. Turn off the main power switch and reinstall the test cover.

**NOTE:** If the unit malfunctions or does not operate according to your expectations, please refer to the Troubleshooting section of the Owner's Manual before calling customer service.

# Packing and unpacking the unit

Instructions for packing unpacking the unit:

## Unpacking:

### Indoor unit:

1. Cut the packing belt.
2. Unpack the package.
3. Take out the packing cushion and packing support.
4. Remove the packing film.
5. Take out the accessories.
6. Lift the machine out and lay it flat.

### Outdoor Unit

1. Cut the packing belt.
2. Take the unit out of the package.
3. Remove the foam from the unit.
4. Remove the packing film from the unit.

## Packing:

### Indoor unit:

1. Put the indoor unit into the packing film.
2. Put the accessories in.
3. Place the packing cushion and packing support.
4. Put the indoor unit into the package.
5. Close the package and seal it.
6. Using the packing belt if necessary.

### Outdoor unit:

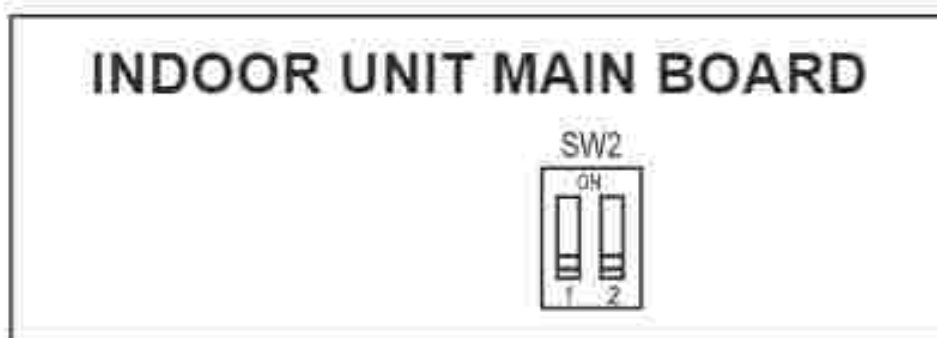
1. Put the outdoor unit into the packing film.
2. Put the bottom foam into the box.
3. Put the outdoor unit into the package, then put the upper packaging foam on the unit.
4. Close the package and seal it.
5. Using the packing belt if necessary.

**NOTE:** Please keep all packaging items if you may need in the future.

Breezeless function of dip switch.

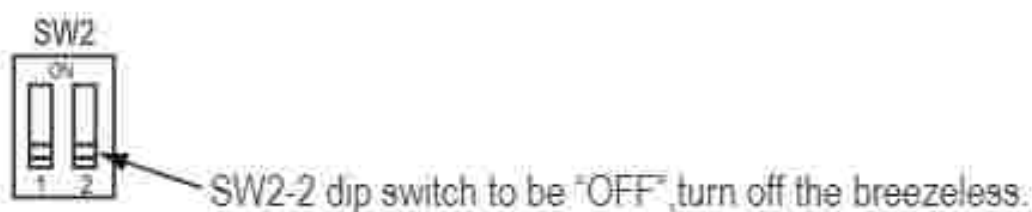
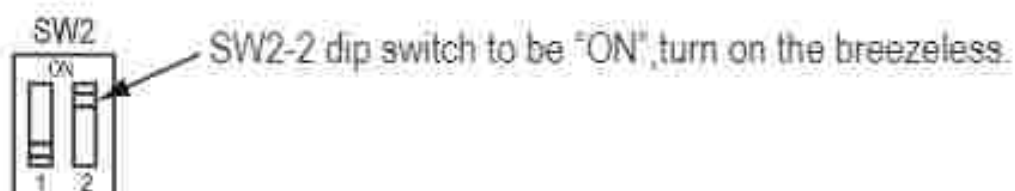
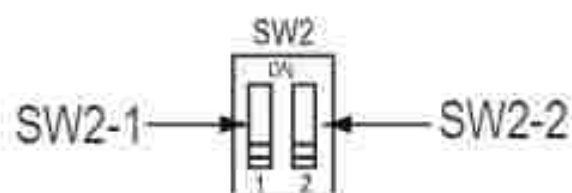
NTOE: This feature is only available under cool mode.

This feature is for some models.



SW2 has 2 dip switches: SW2-1 and SW2-2

SW2-2 is to control the breezeless function.



# Safety Manual - Precautions

## Read Safety Precautions Before Operation and Installation

Incorrect installation due to ignoring instructions can cause serious damage or injury.



### WARNING

#### 1. Installation (Space)

- That the installation of pipe-work shall be kept to a minimum.
- That pipe-work shall be protected from physical damage.
- Where refrigerant pipes shall be compliance with national gas regulations.
- That mechanical connections shall be accessible for maintenance purposes.
- In cases that require mechanical ventilation, ventilation openings shall be kept clear of obstruction.
- When disposing of the product is used, be based on national regulations, properly processed.

#### 2. Servicing

- Any person who is involved with working on or breaking into a refrigerant circuit should hold a current valid certificate from an industry-accredited assessment authority, which authorises their competence to handle refrigerants safely in accordance with an industry recognised assessment specification.

#### 3. Maintenance and repair requiring the assistance of other skilled personnel shall be carried out under the supervision of the person competent in the use of flammable refrigerants.

#### 4. Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.

#### 5. The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater)

#### 6. Be more careful that foreign matter (oil, water, etc) does not enter the piping. Also, when storing the piping, securely seal the opening by pinching, taping, etc.

#### 7. Do not pierce or burn.

#### 8. Be aware that refrigerants may not contain an odour.

#### 9. All working procedure that affects safety means shall only be carried by competent persons.

#### 10. Appliance shall be stored in a well-ventilated area where the room size corresponds to the room area as specific for operation.

#### 11. The appliance shall be stored so as to prevent mechanical damage from occurring.

#### 12. Joints shall be tested with detection equipment with a capability of 5 g/year of refrigerant or better, with the equipment in standstill and under operation or under a pressure of at least these standstill or operation conditions after installation. Detachable joints shall **NOT** be used in the indoor side of the unit (brazed, welded joint could be used).

#### 13. When a FLAMMABLE REFRIGERANT is used, the requirements for installation space of appliance and /or ventilation requirements are determined according to

- the mass charge amount (M) used in the appliance,
- the installation location,
- the type of ventilation of the location or of the appliance.

The maximum charge in a room shall be in accordance with the following:

$$m_{\max} = 2,5 \times (\text{LFL})^{(5/4)} \times h_0 \times (A)^{1/2}$$

or the required minimum floor area  $A_{\min}$  to install an appliance with refrigerant charge  $M$ (kg) shall be in accordance with following:

$$A_{\min} = (M / (2,5 \times (\text{LFL})^{(5/4)} \times h_0))^2$$

Where:

$m_{\max}$  is the allowable maximum charge in a room, in kg;

$M$  is the refrigerant charge amount in appliance, in kg;

$A_{\min}$  is the required minimum room area, in  $\text{m}^2$ ;

$A$  is the room area, in  $\text{m}^2$ ;

$\text{LFL}$  is the lower flammable limit, in  $\text{kg}/\text{m}^3$ ;

$h_0$  is the release height, the vertical distance in metres from the floor to the point of release when the appliance is installed;

$h_0 = (h_{\text{inst}} + h_{\text{rel}})$  or 0,6 m whichever is higher

$h_{\text{rel}}$  is the release offset in metres from the bottom of the appliance to the point of release

$h_{\text{inst}}$  is the installed height in metres of the unit

**Reference installed heights are given below:**

0.0 m for portable and floor mounted;

1.0m for window mounted;

1.8m for wall mounted;

2.2m for ceiling mounted;

If the minimum installed height given by the manufacturer is higher than the reference installed height, then in addition  $A_{\min}$  and  $m_{\max}$  for the reference installed height have to be given by the manufacturer. An appliance may have multiple reference installed heights. In this case,  $A_{\min}$  and  $m_{\max}$  calculations shall be provided for all applicable reference installed heights.

For appliances serving one or more rooms with an air duct system, the lowest opening of the duct connection to each conditioned space or any opening of the indoor unit greater than  $5 \text{ cm}^2$  at the lowest position to the space, shall be used for  $h_0$ . However,  $h_0$  shall not be less than 0,6 m.  $A_{\min}$  shall be calculated as a function of the opening heights of the duct to the spaces and the refrigerant charge for the spaces where leaked refrigerant may flow to, considering where the unit is located. All spaces shall have a floor area more than  $A_{\min}$ .

**NOTE 1** This formula cannot be used for refrigerants lighter than 42 kg/kmol.

**NOTE 2** Some examples of the results of the calculations according to the above formula are given in Tables 1-1 and 1-2.

**NOTE 3** For factory sealed appliances, the nameplate on the unit itself marked the refrigerant charge can be used to calculate  $A_{min}$ .

**NOTE 4** For field charged products, calculation of  $A_{min}$  can be based on the installed refrigerant charge not to exceed the factory specified maximum refrigerant charge.

The maximum charge in a room and the required minimum floor area to install an appliance, please refer to the "Owner's Manual & Installation Manual" of the unit. For specific information on the type of gas and the amount, please refer to the relevant label on the unit itself.

Table 1-1 Max Refrigerant Charge (kg)

Refrigerant Type	LFL(kg/m <sup>3</sup> )	Installation Height H0(m)	Floor Area (m <sup>2</sup> )						
			4	7	10	15	20	30	50
R32	0.306	0.6	0.68	0.90	1.08	1.32	1.53	1.87	2.41
		1.0	1.14	1.51	1.80	2.20	2.54	3.12	4.02
		1.8	2.05	2.71	3.24	3.97	4.58	5.61	7.24
		2.2	2.50	3.31	3.96	4.85	5.60	6.86	8.85
		0.6	0.05	0.07	0.08	0.10	0.11	0.14	0.18
R290	0.038	1.0	0.08	0.11	0.13	0.16	0.19	0.23	0.30
		1.8	0.15	0.20	0.24	0.29	0.34	0.41	0.53
		2.2	0.18	0.24	0.29	0.36	0.41	0.51	0.65

Table 1-2 Min. Room Area (m<sup>2</sup>)

Refrigerant Type	LFL(kg/m <sup>3</sup> )	Installation Height H0(m)	Charge Amount in kg Minimum Room Area (m <sup>2</sup> )						
			1.224kg	1.836kg	2.448kg	3.072kg	4.896kg	6.12kg	7.956kg
R32	0.306	0.6		29	51	116	206	321	543
		1.0		10	19	42	74	116	196
		1.8		3	6	13	23	36	60
		2.2		2	4	9	15	24	40
		0.152kg	0.228kg	0.304kg	0.456kg	0.608kg	0.76kg	0.988kg	
R290	0.038	0.6		82	146	328	584	912	1341
		1.0		30	53	118	210	328	555
		1.8		9	16	36	65	101	171
		2.2		6	11	24	43	68	115

# Information Servicing

## 1. Checks to the area

Prior to beginning work on systems containing flammable refrigerants, safety checks are necessary to ensure that the risk of ignition is minimised. For repair to the refrigerating system, the following precautions shall be complied with prior to conducting work on the system.

## 2. Work procedure

Works shall be undertaken under a controlled procedure so as to minimise the risk of a flammable gas or vapour being present while the work is being performed.

Technical personnel in charge of operation, supervision, maintenance of air-conditioning systems shall be adequately instructed and competent with respect to their tasks.

Works shall be undertaken with appropriate tools only (In case of uncertainty, please consult the manufacturer of the tools for use with flammable refrigerants)

## 3. General work area

All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided. The area around the work space shall be sectioned off. Ensure that the conditions within the area have been made safe by control of flammable material.

## 4. Checking for presence of refrigerant

The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with flammable refrigerants, i.e. no sparking, adequately sealed or intrinsically safe.

## 5. Presence of fire extinguisher

If any hot work is to be conducted on the refrigeration equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand. Have a dry power or CO<sub>2</sub> fire extinguisher adjacent to the charging area.

## 6. No ignition sources

No person carrying out work in relation to a refrigeration system which involves exposing any pipe work that contains or has contained flammable refrigerant shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which flammable refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. "NO SMOKING" signs shall be displayed.

## 7. Ventilated area

Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

## 8. Checks to the refrigeration equipment

Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times the manufacturer's maintenance and service guidelines shall be followed. If in doubt consult the manufacturer's technical department for assistance. The following checks shall be applied to installations using flammable refrigerants

- the charge size is in accordance with the room size within which the refrigerant containing parts are installed;
- the ventilation machinery and outlets are operating adequately and are not obstructed;
- if an indirect refrigerating circuit is being used, the secondary circuits shall be checked for the presence of refrigerant; marking to the equipment continues to be visible and legible.
- marking and signs that are illegible shall be corrected;
- refrigeration pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

## 9. Checks to electrical devices

Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, and adequate temporary solution shall be used. This shall be reported to the owner of the equipment so all parties are advised.

### Initial safety checks shall include:

- that capacitors are discharged; this shall be done in a safe manner to avoid possibility of sparking
- no live electrical components and wiring are exposed while charging, recovering or purging the system;
- that there is continuity of earth bonding.

## 10. Repairs to sealed components

- 10.1 During repairs to sealed components, all electrical supplies shall be disconnected from the equipment being worked upon prior to any removal of sealed covers, etc. If it is absolutely necessary to have an electrical supply to equipment during servicing, then a permanently operating form of leak detection shall be located at the most critical point to warn of a potentially hazardous situation.
- 10.2 Particular attention shall be paid to the following to ensure that by working on electrical components, the casing is not altered in such a way that the level of protection is affected. This shall include damage to cables, excessive number of connections, terminals not made to original specification, damage to seals, incorrect fitting of glands, etc.
  - Ensure that apparatus is mounted securely.
  - Ensure that seals or sealing materials have not degraded such that they no longer serve the purpose of preventing the ingress of flammable atmospheres. Replacement parts shall be in accordance with the manufacturer's specifications.

**NOTE:** The use of silicon sealant may inhibit the effectiveness of some types of leak detection equipment. Intrinsically safe components do not have to be isolated prior to working on them.

### 11. Repair to intrinsically safe components

Do not apply any permanent inductive or capacitance loads to the circuit without ensuring that this will not exceed the permissible voltage and current permitted for the equipment in use. Intrinsically safe components are the only types that can be worked on while live in the presence of a flammable atmosphere. The test apparatus shall be at the correct rating. Replace components only with parts specified by the manufacturer. Other parts may result in the ignition of refrigerant in the atmosphere from a leak.

### 12. Cabling

Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.

### 13. Detection of flammable refrigerants

Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used.

### 14. Leak detection methods

The following leak detection methods are deemed acceptable for systems containing flammable refrigerants. Electronic leak detectors shall be used to detect flammable refrigerants, but the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed and the appropriate percentage of gas (25% maximum) is confirmed. Leak detection fluids are suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work.

If a leak is suspected, all naked flames shall be removed or extinguished. If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak. For appliances containing FLAMMABLE REFRIGERANTS, oxygen free nitrogen (OFN) shall then be purged through the system both before and during the brazing process.

### 15. Removal and evacuation

When breaking into the refrigerant circuit to make repairs - or for any other purpose - conventional procedures shall be used. However, for FLAMMABLE REFRIGERANTS it is important that best practice is followed since flammability is a consideration. Opening of the refrigerant systems shall not be done by brazing. The following procedure shall be adhered to:

- remove refrigerant;
- purge the circuit with inert gas;
- evacuate;
- purge again with inert gas;
- open the circuit by cutting or brazing.

The refrigerant charge shall be recovered into the correct recovery cylinders. For appliances containing FLAMMABLE REFRIGERANTS, the system shall be "flushed" with OFN to render the unit safe. This process may need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems.

For appliances containing FLAMMABLE REFRIGERANTS, flushing shall be achieved by breaking the vacuum in the system with OFN and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum. This process shall be repeated until no refrigerant is within the system. When the final OFN charge is used, the system shall be vented down to atmospheric pressure to enable work to take place. This operation is absolutely vital if brazing operations on the pipe-work are to take place.

Ensure that the outlet for the vacuum pump is not closed to any ignition sources and there is ventilation available.

## 16. Charging procedures

In addition to conventional charging procedures, the following requirements shall be followed:

- Works shall be undertaken with appropriate tools only (In case of uncertainty, please consult the manufacturer of the tools for use with flammable refrigerants)
- Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them.
- Cylinders shall be kept upright.
- Ensure that the refrigeration system is earthed prior to charging the system with refrigerant.
- Label the system when charging is complete (if not already).
- Extreme care shall be taken not to overfill the refrigeration system.
- Prior to recharging the system it shall be pressure tested with OFN. The system shall be leak tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

## 17. Decommissioning

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely or safely vented (For R290 refrigerant models). Prior to the task being carried out, an oil and refrigerant sample shall be taken.

In case analysis is required prior to re-use of reclaimed refrigerant. It is essential that electrical power is available before the task is commenced.

a) Become familiar with the equipment and its operation.

b) Isolate system electrically

c) Before attempting the procedure ensure that:

- mechanical handling equipment is available, if required, for handling refrigerant cylinders;
- all personal protective equipment is available and being used correctly;
- the recovery process is supervised at all times by a competent person;
- recovery equipment and cylinders conform to the appropriate standards.

- d) Pump down refrigerant system, if possible.
- e) If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
- f) Make sure that cylinder is situated on the scales before recovery takes place.
- g) Start the recovery machine and operate in accordance with manufacturer's instructions.
- h) Do not overfill cylinders. (No more than 70% liquid volume. The liquid density of the refrigerant with a reference temperature of 50°C).
- i) Do not exceed the maximum working pressure of the cylinder, even temporarily.
- j) When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.
- k) Recovered refrigerant shall not be charged into another refrigeration system unless it has been cleaned and checked.

### 18. Labelling

Equipment shall be labelled stating that it has been de-commissioned and emptied of refrigerant. The label shall be dated and signed. Ensure that there are labels on the equipment stating the equipment contains flammable refrigerant.

### 19. Recovery

When removing refrigerant from a system, either for service or decommissioning, it is recommended good practice that all refrigerants are removed safely.

When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct numbers of cylinders for holding the total system charge are available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure relief valve and associated shut-off valves in good working order.

Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs. The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of flammable refrigerants. In addition, a set of calibrated weighing scales shall be available and in good working order.

Hoses shall be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult manufacturer if in doubt.

The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant Waste Transfer Note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.

If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The evacuation process shall be carried out prior to returning the compressor to the suppliers. Only electric heating to the compressor body shall be employed to accelerate this process. When oil is drained from a system, it shall be carried out safely.

## 20. Venting of HC Refrigerant (R290)

Venting may be carried out as an alternative to recovering the refrigerant. Because HC refrigerants have no ODP and negligible GWP, under certain circumstances it may be considered acceptable to vent the refrigerant. However, if this is to be considered, it should be done in accordance with the relevant national rules or regulations, if they permit.

In particular, before venting a system, it would be necessary to:






- Ensure that legislation relating to waste material has been considered
- Ensure that environmental legislation has been considered
- Ensure that legislation addressing safety of hazardous substances is satisfied
- Venting is only carried out with systems that contain a small quantity of refrigerant, typically less than 500 g.
- Venting to inside a building is not permissible under any circumstances
- Venting must not be to a public area, or where people are unaware of the procedure taking place
- The hose must be of sufficient length and diameter such that it will extend to at least 3 m beyond the outside of the building
- The venting should only take place on the certainty that the refrigerant will not get blown back into any adjacent buildings, and that it will not migrate to a location below ground level
- The hose is made of material that is compatible for use with HC refrigerants and oil
- A device is used to raise the hose discharge at least 1 m above ground level and so that the discharge is pointed in an upwards direction (to assist with dilution)
- The end of the hose can now discharge and disperse the flammable fumes into the ambient air.
- There should not be any restriction or sharp bends within the vent-line which will hinder the ease of flow.
- There must be no sources of ignition near the hose discharge
- The hose should be regularly checked to ensure that there are no holes or kinks in it, that could lead to leakage or blocking of the passage of flow

When carrying out the venting, the flow of refrigerant should be metered using manifold gauges to a low flow rate; so as to ensure the refrigerant is well diluted. Once the refrigerant has ceased flowing, if possible, the system should be flushed out with OFN; if not, then the system should be pressurized with OFN and the venting procedure carried out two or more times, to ensure that there is minimal HC refrigerant remaining inside the system.

## 21. Transportation, marking and storage for units

1. Transport of equipment containing flammable refrigerants  
Compliance with the transport regulations
2. Marking of equipment using signs  
Compliance with local regulations
3. Disposal of equipment using flammable refrigerants  
Compliance with national regulations
4. Storage of equipment/appliances  
The storage of equipment should be in accordance with the manufacturer's instructions.
5. Storage of packed (unsold) equipment  
Storage package protection should be constructed such that mechanical damage to the equipment inside the package will not cause a leak of the refrigerant charge.  
The maximum number of pieces of equipment permitted to be stored together will be determined by local regulations.

### Explanation of symbols displayed on the indoor unit or outdoor unit

	<b>WARNING</b>	This symbol shows that this appliance used a flammable refrigerant. If the refrigerant is leaked and exposed to an external ignition source, there is a risk of fire.
	<b>CAUTION</b>	This symbol shows that the operation manual should be read carefully.
	<b>CAUTION</b>	This symbol shows that a service personnel should be handling this equipment with reference to the installation manual.
	<b>CAUTION</b>	
	<b>CAUTION</b>	This symbol shows that information is available such as the operating manual or installation manual.



**CAUTION: Risk of fire**

The design and specifications are subject to change without prior notice for product improvement. Any updates to the manual will be uploaded to the service website, please check for the latest version.

If you have any concerns, please contact us at the following:

Customer hotline: **(02) 8852-6868**

Text hotline: **+63 917-881-8982**

Email: **customerservice@kolinphil.com.ph**

Also, please like and follow us on our social media accounts:

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Tiktok: **kolinphilippines**

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**KPII120123**



# Kolin Phils. Int'l., Inc.

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Cebu	Lot 758-B-1, P. Suico St. Upper Tabok, Mandaue City, Cebu	(032) 253 - 9997 / (032) 253 - 7944
Dagupan	Unit #1 107 Caranglaan District, Dagupan City, Pangasinan	(075) 523 - 2832
Davao	Blk 17 Lot 9, Calamansi St., Juna Subd., Matina, Davao City	(082) 227 - 7063
Iloilo	Door #4, 5 & 7, D' Appliance Arcade, South Fundidor, Molo, Iloilo City	(033) 336 - 1970
Pampanga	LRK Commercial Bldg., Jose Abad Ave., Lagundi, Mexico, Pampanga	(045) 455 - 2934

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